



Service Manual

SG-500E
SG-500H



Auto Program Search System



DOLBY SYSTEM®

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PHOTO SG-500H

MODEL SG-500H SG-500E

In the interests of user-safety the set should be restored to its original condition and only parts identical to those specified be used.

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PARTS LIST

SHARP CORPORATION OSAKA, JAPAN

SPECIFICATIONS

TUNER-AMPLIFIER

General Description

Power source: a.c. 110/220/240V, 50/60Hz
 Power consumption: 500W
 Semiconductor: 31-IC (Integrated Circuit)
 1-FET
 65-Transistor
 128-Diode
 36-LED

Dimensions: 770mm (Width)
 183mm (Height)
 456mm (Depth)

Weight: 25 kg

Audio Section

Music power output: 2 x 80W/4 ohm both channels drive
 (at 0.5% distortion)

Continuous power output (at 1kHz):
 2 x 45W/4 ohms, both channels driven,
 0.5% distortion

Intermodulation distortion:
 0.5% at 40W

Power bandwidth: 35Hz ~ 15kHz at 0.5% distortion

Frequency response: 20Hz ~ 20,000Hz

Channel separation: 48dB (1kHz)

Tone control: Bass ± 10 dB (at 100Hz)
 Treble ± 10 dB (at 10kHz)

Input sensitivity and input impedance:
 MIC; 1mV 10K ohms
 REC/PB; 150mV/47K ohms

Output level and output impedance:
 Speaker; 4 ohms
 Headphones; 8 ohms
 REC/PB; 30mV/100K ohms

FM Section

Frequency coverage: 87.6 ~ 108MHz

Usable sensitivity: 1.88 μ V (40kHz deviation, S/N=26dB)

Harmonic distortion: 0.5%

S/N ratio: 60dB

Stereo separation: 38dB (at 1kHz)

AM Section

Frequency coverage: LW; 150 ~ 370kHz
 MW; 520 ~ 1620kHz
 SW; 5.95 ~ 18MHz

Sensitivity: LW; 280 μ V/m
 MW; 280 μ V/m
 SW; 63 μ V

IF rejection (MW): 50dB

Image rejection (MW): 46dB

SG-500E

Power source: a.c. 240V, 50Hz

TAPE-DECK

Type: 4-track 2-channel stereo cassette tape
 deck with APSS and Dolby N.R.
 system

Tape: Philips standard compact cassette tape

Semiconductors: 1-LSI
 19-IC
 54-Transistor
 53-Diode

Wow and flutter: 0.15% (DIN 45 507)

Frequency response: Normal tape: 20 ~ 14,000Hz
 (DIN 45 511)
 CrO₂ tape or Fe-Cr tape; 20 ~ 15,000
 Hz (DIN 45 511)

Signal to Noise ratio: 54dB

Channel Separation: 28dB (1kHz)

RECORD PLAYER

Semiconductors: 15-IC
 43-Transistor
 14-Diode

TURNTABLE

Motor: DC servo motor with 72 pole fre-
 quency generator

Drive system: Direct-drive system

Speed: 33-1/3 and 45 rpm

Speed control range: Within $\pm 4\%$ (Individual control for
 33-1/3 and 45 rpm)

Wow and flutter: Less than 0.045% (WRMS)

Rumble: Better than 65dB (DINB)

Turntable platter: 31cm (12in) aluminum diecast with
 stroboscope marks

TONEARM

Type: Static-balance S-shaped pipe arm

Effective length: 210mm

Overhang: 14mm

Off-set angle: 19°

Cartridge weight range: 4 ~ 11 grams

Stylus pressure: 2 grams

Specifications are subject to change without prior notice.

DISASSEMBLY

* Disconnect all leads connected to the back of the unit.

A DUST COVER REMOVAL (Refer to Figure 3-1)

1. Fully open the dust cover.
2. Remove two hinges by moving the dust cover to the direction of arrow mark.

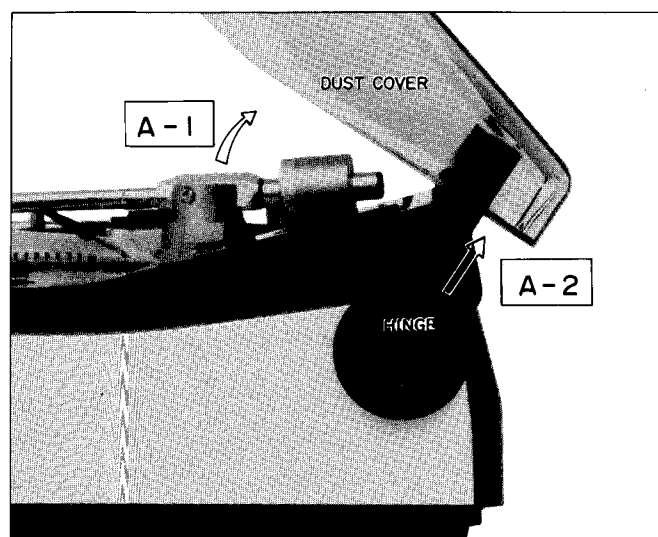


Figure 3-1

B PLAYER BOARD REMOVAL (Refer to Figure 3-2)

1. Remove the turntable sheet and the turntable.
2. Remove two screws retaining the player board.
3. Loosen the screw retaining the player board and move the screw in the arrowed direction.
4. Lift up the player board, and disconnect four sockets (CNS904-6 Pin, CNS905-7 Pin, CNS201-3 Pin, CNS302-2 Pin).

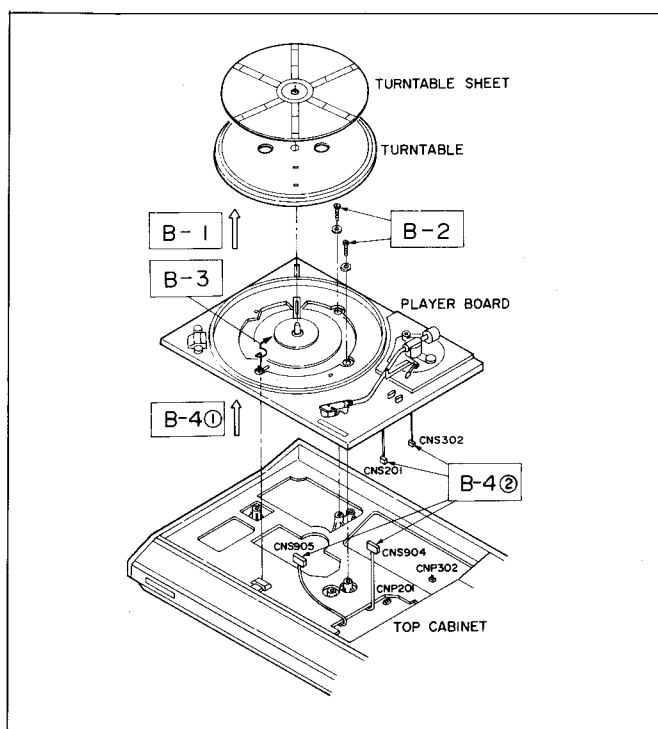


Figure 3-2

C TOP CABINET REMOVAL (Refer to Figures 3-3 and 3-4)

1. Remove the player board as described in player board removal.
2. Remove three knobs (REC LEVEL/TUNING) and the rubber cap. (Fig. 3-3)
3. Push the EJECT button and remove nine screws retaining the top cabinet. (Fig. 3-4)
4. Gently lift up the top cabinet.

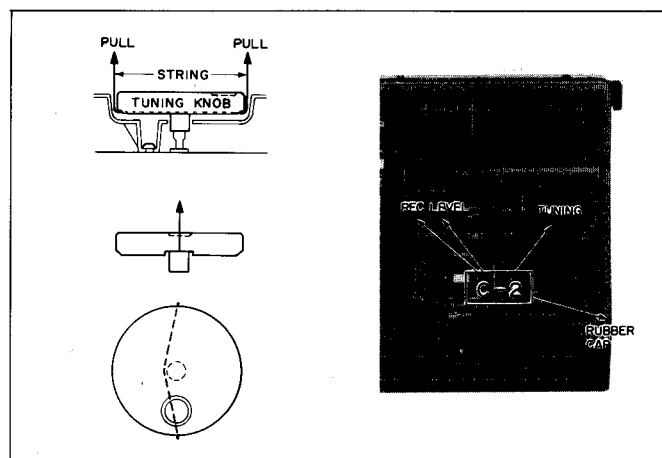


Figure 3-3

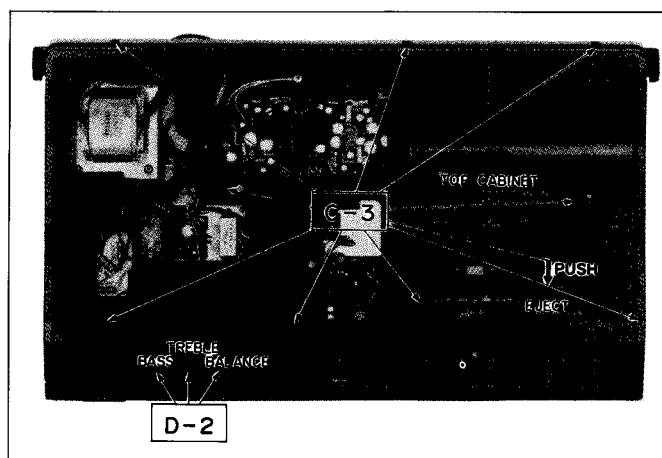


Figure 3-4

D FRONT PANEL REMOVAL

(Refer to Figures 3-4, 4-1, 4-2 and 4-3)

1. Remove the top cabinet as described in top cabinet removal.
2. Remove three knobs (BASS/TREBLE/BALANCE). (Fig. 3-4)
3. Remove six screws retaining the front cabinet. (Fig. 4-1 and 4-3)
4. Gently pull out the front panel while holding both sides.
5. Remove the screw retaining the power source indicator P.W. Board and disconnect six sockets (CNS701-7 Pin, CNS702-9 Pin, CNS801-12 Pin, CNS802-10 Pin, CNS803-18 Pin, CNS804-12 Pin). (Fig. 4-2)

E TAPE DECK REMOVAL (Refer to Figure 4-1)

1. Remove the top cabinet as described in top cabinet removal.
2. Disconnect the socket (CNS501-12 Pin) connected to the connecting P.W. Board.
3. Remove four screws retaining the tape deck.
4. Lift up the tape deck, and disconnect the socket (CNS503-8 Pin) connected to the tape deck P.W. Board.

F BOTTOM COVER REMOVAL (Refer to Figure 4-3)

1. Remove two screws retaining the bottom cover.

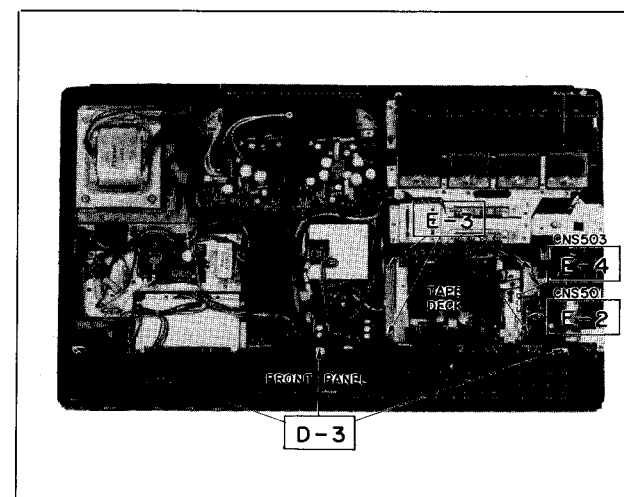


Figure 4-1

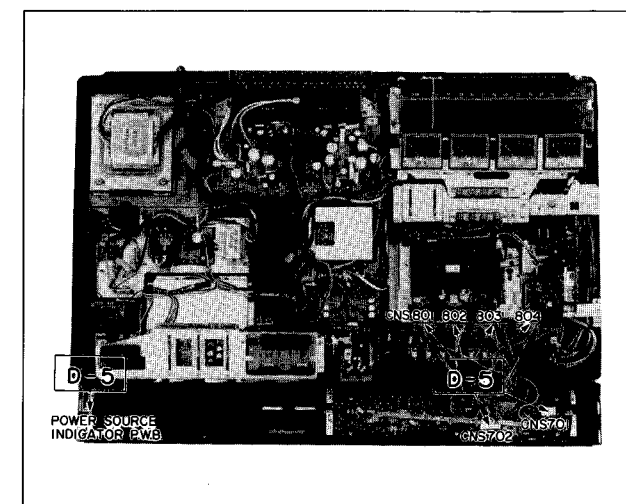


Figure 4-2

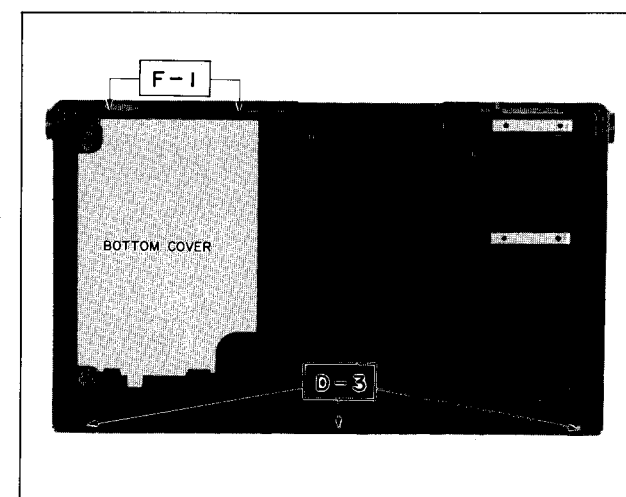


Figure 4-3

SG-500H ONLY

Check the preset voltage selector before connecting the mains plug to a outlet. If the setting is different from that of your local mains supply voltage, the selector must be re-set as follows.

Rotate the voltage selector by using a screwdriver so that your local voltage number can be seen.

Note:

Since this set uses DC motors, the operation is regardless of whether a household power supply is of 50Hz or 60Hz.

VOLTAGE SELECTION

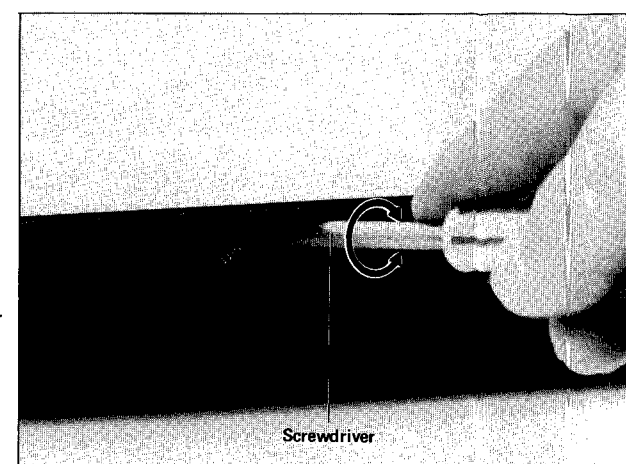


Figure 4-4

LOCATION OF CONTROLS

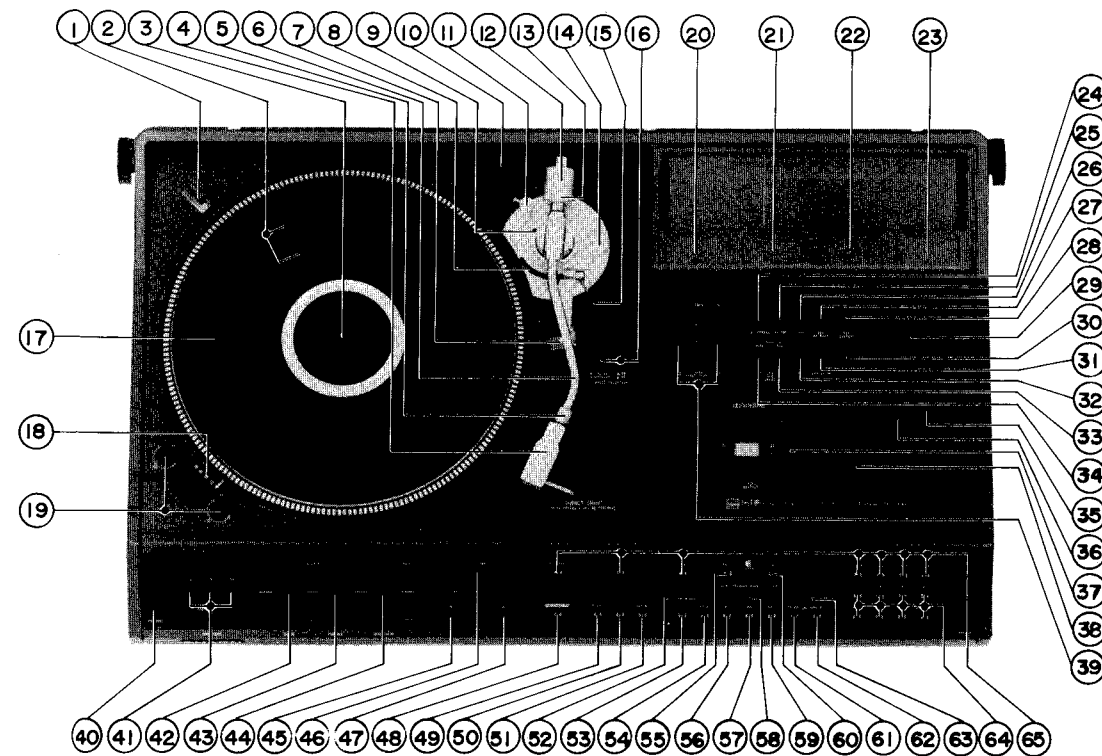


Figure 5-1

- | | | |
|---|--------------------------------------|--|
| 1. Record-size detection light | 25. Stereo-mono selector | 53. Record button |
| 2. Record-size detector part | 26. AFC switch | 54. Stop button |
| 3. Center spindle | 27. FM muting switch | 55. Reverse APSS button |
| 4. Head-shell | 28. FM stereo indicator | 56. Playback button |
| 5. Clamp collar | 29. Manual tuning control | 57. Rewind button |
| 6. Tonearm | 30. Dolby indicator | 58. APSS indicator |
| 7. Tonearm rest | 31. Dolby switch | 59. Fast forward button |
| 8. Tonearm lifter | 32. ALC switch | 60. Forward APSS button |
| 9. Adjusting screw for automatic lead-in | 33. Equalization selector switch | 61. Pause button |
| 10. Adaptor for 17cm (7") EP-record | 34. Bias selector switch | 62. Space setter button |
| 11. Lateral balance control weight | 35. Tape counter reset button | 63. Forward indicator |
| 12. Counter weight | 36. Digital tape counter | 64. FM pre-set tuning buttons |
| 13. Scale ring | 37. Cassette chamber | 65. Function selector buttons |
| 14. Anti-skating control | 38. Cassette eject button | 66. Mains voltage selector |
| 15. Cueing control lever | 39. Record level controls | 67. Mains power switch |
| 16. Manual speed selector | 40. Power source indicator | 68. Headphones jack |
| 17. Turntable-platter | 41. Speakers selector buttons | 69. FM pre-set tuning controls |
| 18. Stroboscope lamp | 42. Bass control | 70. Microphone jacks |
| 19. Fine adjustment knobs for turntable speed | 43. Treble control | 71. Beat canceller switch |
| 20. Record and playback level meter (Left channel) | 44. Balance control | 72. FM aerial socket (300 ohms) |
| 21. Record and playback level meter (Right channel) | 45. Volume decrease button | 73. LW/MW/SW aerial socket |
| 22. FM pre-set meter | 46. Volume indicator | 74. Record/Playback socket |
| 23. Signal strength meter | 47. Volume increase button | 75. Speaker terminals-A |
| 24. Loudness switch | 48. Stand-by button | 76. Speaker terminals-B |
| | 49. Play switch for turntable | 77. U.K. standard FM co-axial aerial socket (75ohms), provided only for model SG-500E) |
| | 50. Cut-out button for turntable | |
| | 51. Repeat play button for turntable | |
| | 52. Reverse indicator | |

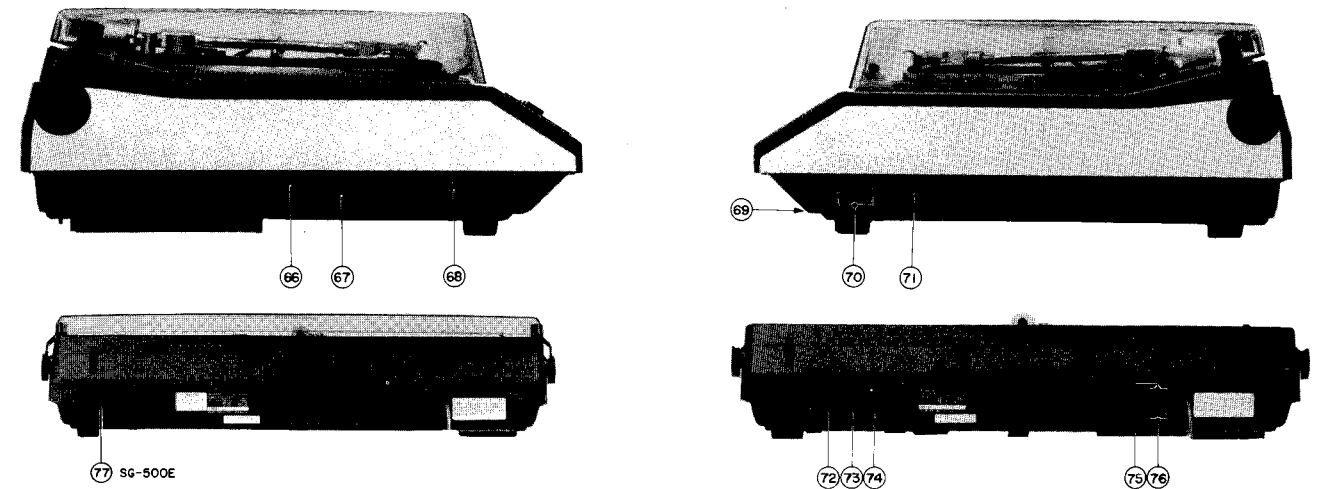


Figure 6-1

DIAL CORD STRINGING

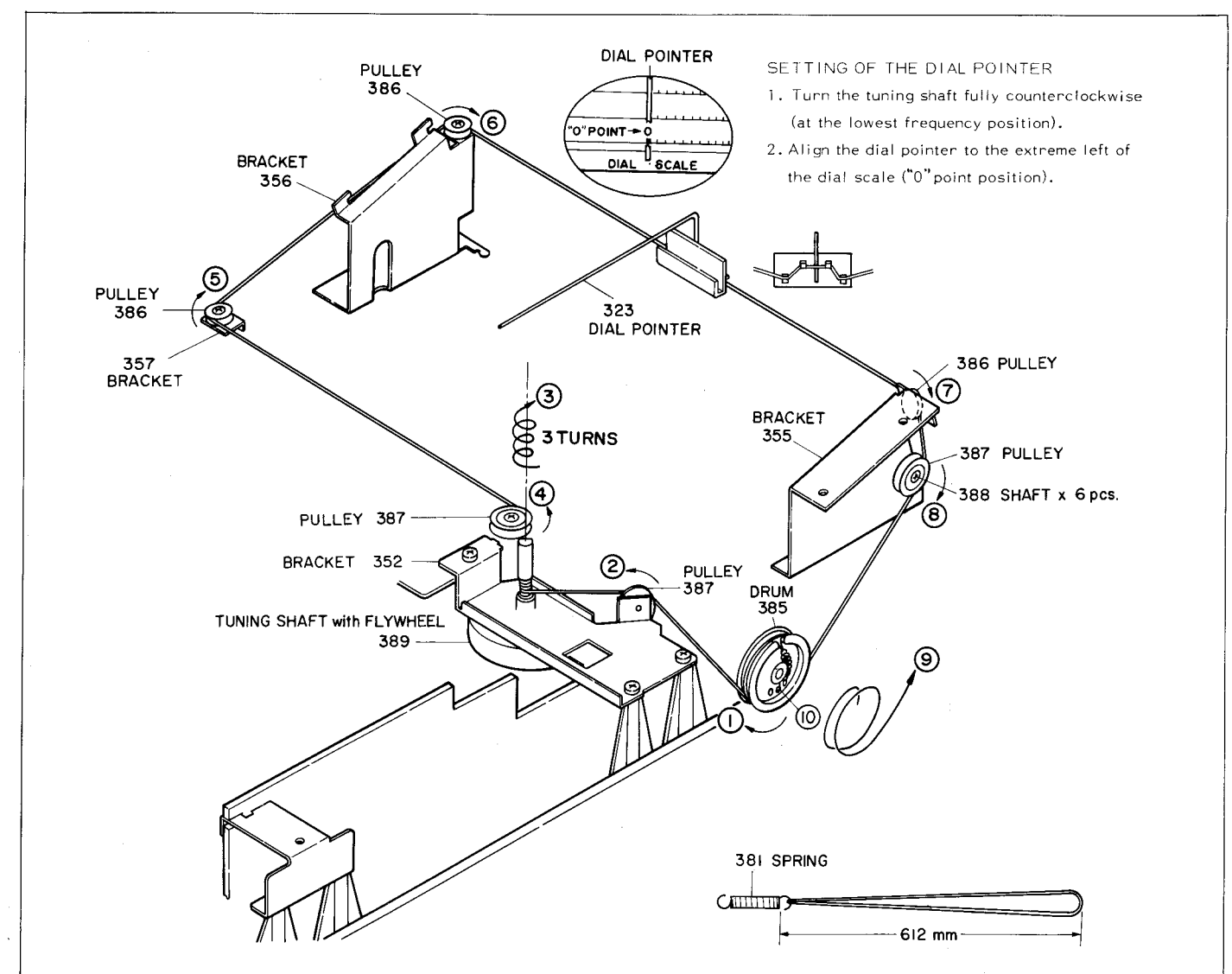


Figure 6-2

CIRCUIT DESCRIPTION

SG-500H BLOCK DIAGRAM

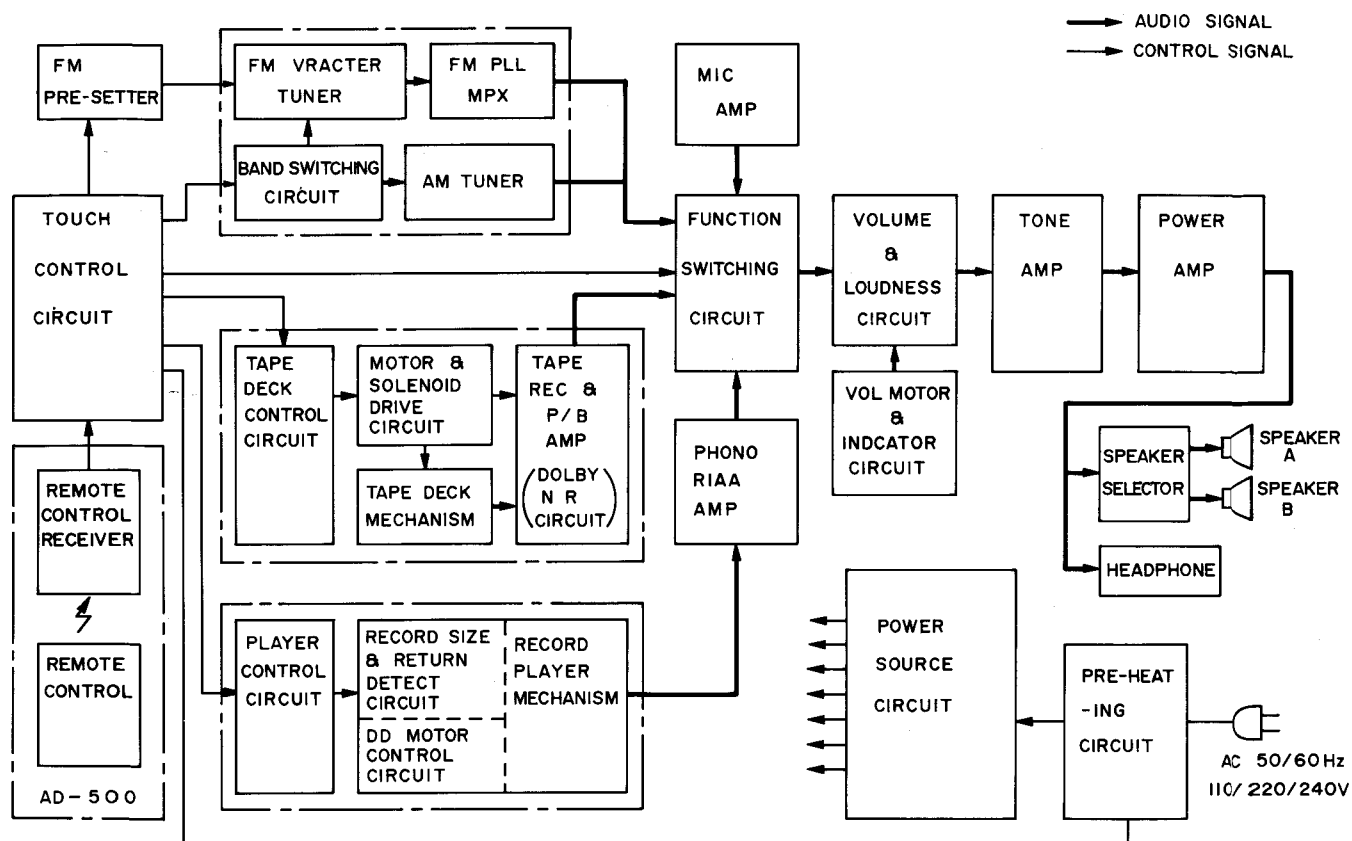


Figure 7-1

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1. PRE AMP/POWER AMP/POWER SUPPLY (Refer to Figures 8-1 to 15-1)

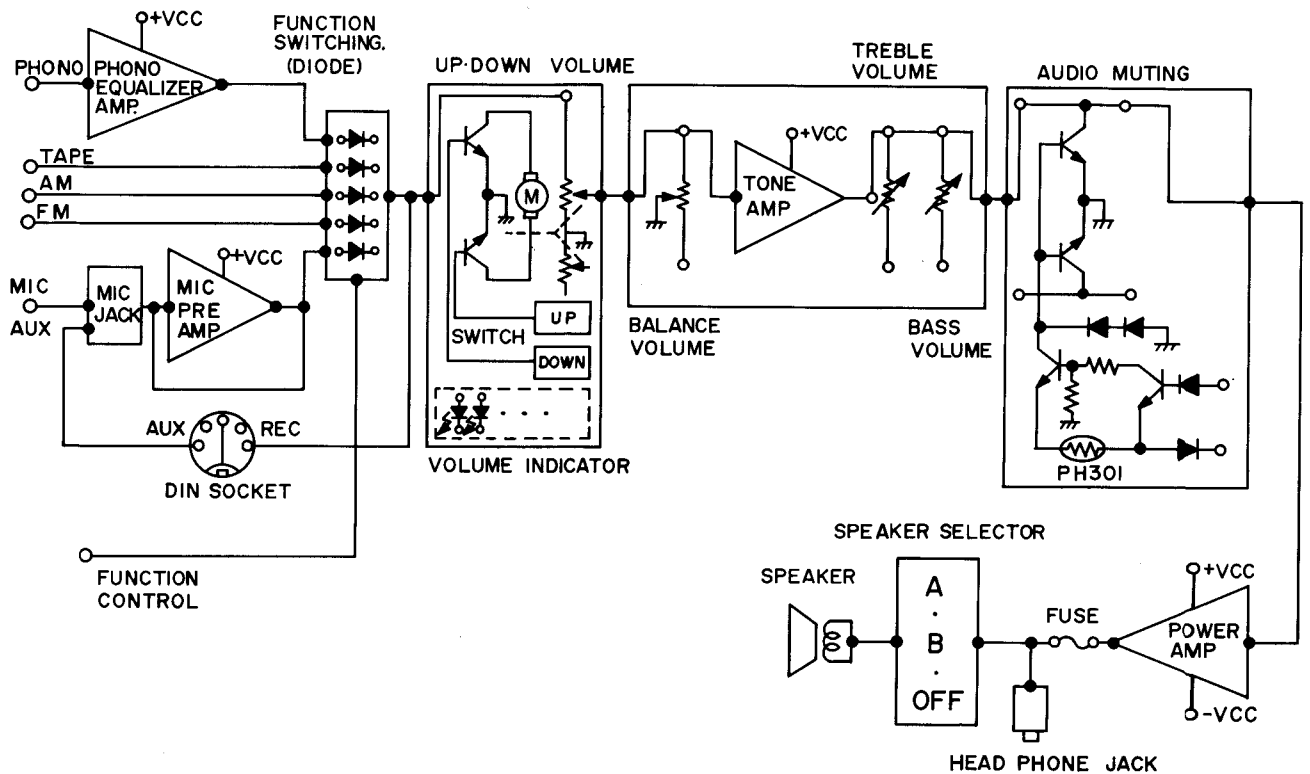


Figure 8-1

1.1 SYNOPSIS (Refer to Figure 8)

- The input source consists of TAPE, PHONO, MIC/AUX, FM and AM terminals; out of them, inputs to the PHONO and MIC terminals are, respectively via the equalizer amplifier and microphone amplifier, to their respective function circuits.
- The function switching circuit is composed of the diode (IS1555) which serves as a switching element.
- The volume control is based on motor drive system and it is provided with the volume indicator (LED)

telling its position over the range from "MIN" to "MAX". Coming out of the volume control, the signal is passed on, through the next balance control, to the tone control amplifier. Then the signal output from the tone control amplifier is supplied to the power amplifier via the audio muting circuit. Going out of the power amplifier, the signal enters both the headphone jack and speaker selector: the speaker selector allows three kinds of the speaker selection, "A", "B" or "A+B".

1.2 CIRCUIT COMPOSITION

1.2.1 Power Amplifier Circuit (Refer to Figure 9-1)

The power amplifier circuit includes IC (STK-082) which is based on 2-power supply system and it is an all-stage directly coupled circuit where the input stage is of a differential amplifier circuit and the output stage, of a pure complementary circuit, thus assuring a very lowered distortion factor and better frequency characteristic.

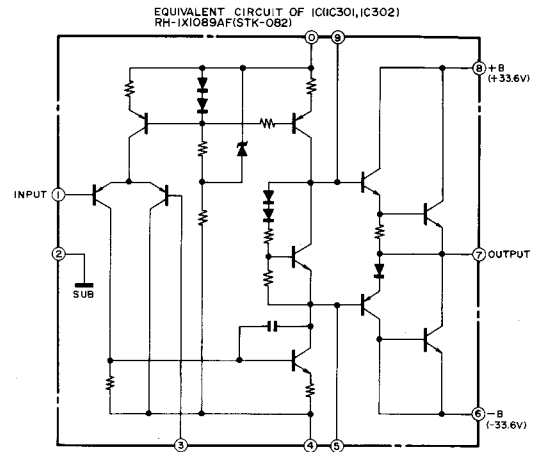


Figure 9-1

1.2.2 Tone Control Circuit (Refer to Figure 9-2)

The tone control amplifier is made of a low-noise, low-distortion IC; the configuration of a C-R type tone control circuit can meet the frequency range from 100 Hz to 10 kHz (± 10 dB).

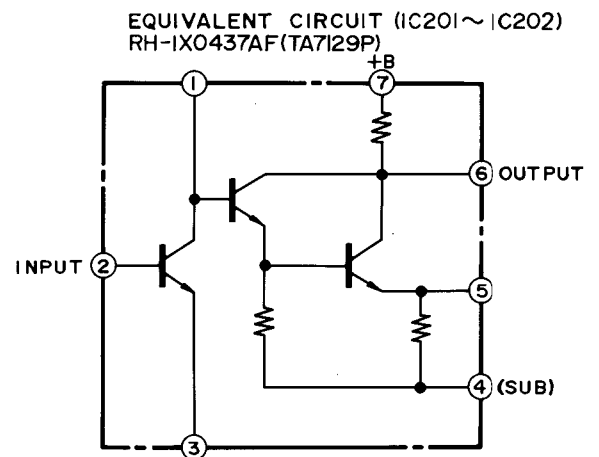


Figure 9-2

1.2.3 UP/DOWN Volume Control Circuit

The UP/DOWN volume control circuit comprises 6 transistors, 5 diodes, 7 LED's, volume control and motor. The UP/DOWN operation depends upon a motor drive system; the volume regulation is achieved just by lightly pushing the UP/DOWN switch and the volume indication (LED) is designed to show 7 degrees of the volume amount.

1. 2. 4 Function Switching Circuit

The function switching circuit is based on a diode-matrix design and it provides switching operation with the digital signal generated by the function selector switch when set at any of its positions.

1. 2. 5 Audio Muting Circuit

The audio muting circuit is so designed that it begins to function when the stand-by switch is turned on or off, or the tape deck gets in any of the modes STOP/FF/REW/APSS-FWD/APSS-REW or STOP-PAUSE: the result is that possible generation of noises and abnormal temperature increase of the heat sink plate at that time can be eliminated.

1. 2. 6 Speaker Selector Circuit (Refer to Figure 10)

The speaker selector circuit can be effective in 4 positions, A/B/A+B and OFF any of which can be chosen by the switch (SW-2).

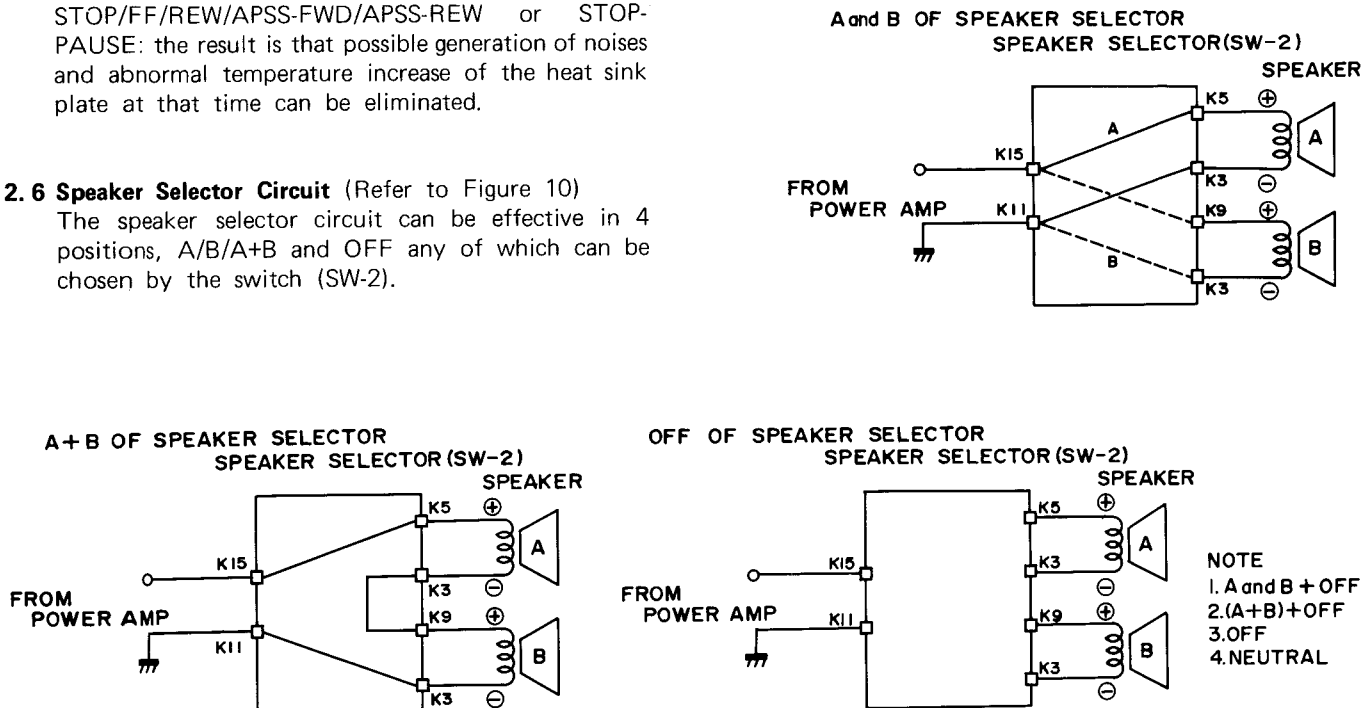
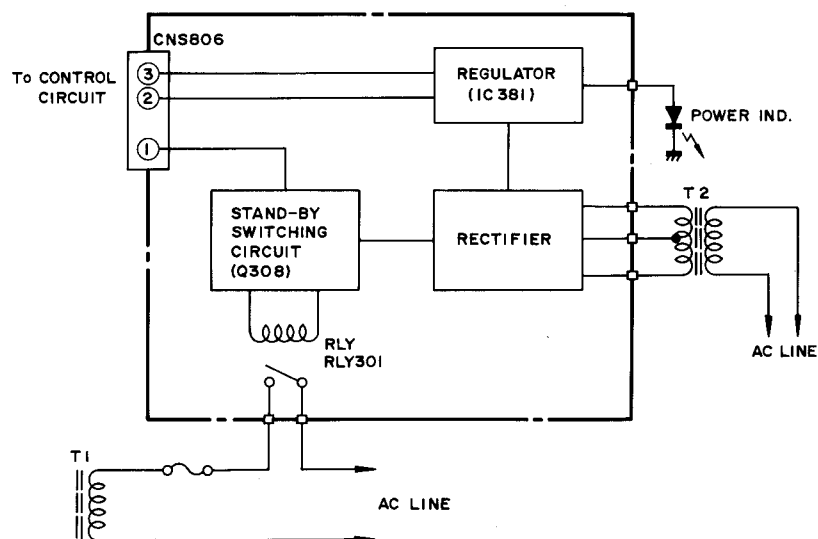


Figure 10-1

1.2.7 Power Supply and Sub Power Supply (Refer to Figure 11)



PRE-HEATING, BLOCK DIAGRAM

Figure 11-1

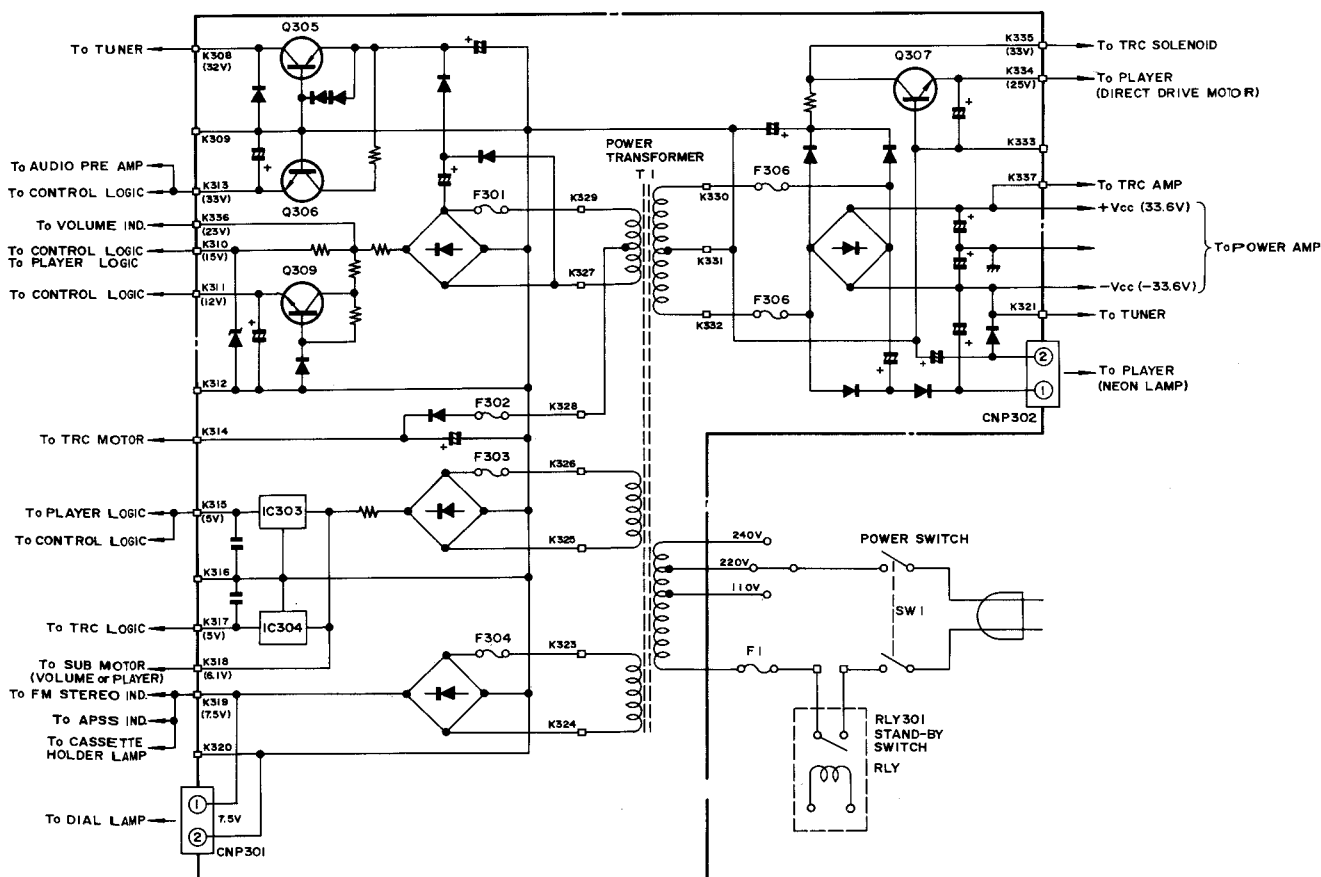


Figure 11-2

1.3 CIRCUIT EXPLANATION

1.3.1 Function Switching Circuit (Refer to Figure 12)

The function switching circuit, with the assistance by the diode matrix circuit begins to operate with the digital signal caused by the touch control circuit, so that it can find out what type of input has been applied to the set.

- In the case of "PHONO" input (at L-channel)

When the touch button coupled with the touch control circuit is touched, the IC701, Q801 and CNS202 ④ are energized in this order resulting in that the potential at the terminal ④ of CNP-202 is changed from 0 V to approx. 33 V and this condition goes on. This voltage (33 V) is applied via the R219 and R229 to the D201 which will be thus biased in the forward

direction to be turned on: the result is that a current flows, through the R295, in the base of Q207. With the D201 turned on, the signal coming out of the phono equalizer amplifier IC201 is passed on to the base of Q207 via the C223, then to be supplied to the next-stage volume control through the C231, and to the record amplifier of tape deck through the CNS504.

C218: Serves to absorb switching noises possibly caused when the switch is turned on.

D211: Serves to assure a faster cutting off of the circuit when the switch is turned off.

Q207: Serves as a buffer amplifier to prevent impedance variations possibly caused in the succeeding stages.

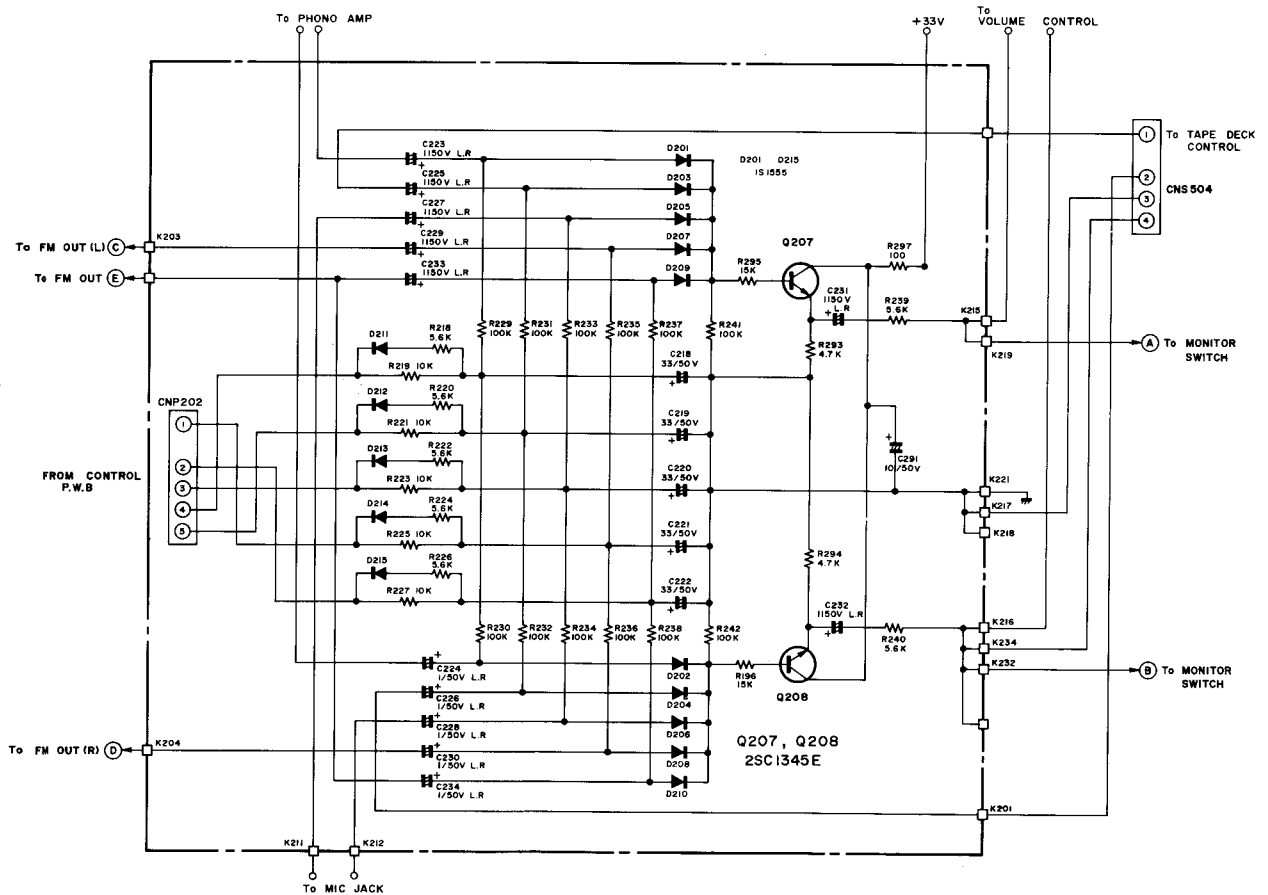


Figure 12-1

1.3.2 UP/DOWN Volume Control and Indicator Circuit (Refer to Figure 13)

The right-and-left du'plex volume control circuit is coupled with the low-speed DC motor: the design is that the UP/DOWN touch switch is to rotate the motor to right or to left, thereby enabling the volume control. This volume control circuit is electrically interlocked with the 7-point changeable switch and MIN/MAX detector switch, so that either of the 7 LED's lights up according to the degree of volume amount which has been selected by the listener.

■ UP/DOWN Motor Control (Refer to Figure 13)

- In the case of UP position:
When the switch SW201 (UP) is set at "ON", a potential of +6 V is applied to the R262 and the base of Q204 is thus biased so that this transistor is turned on: the result is that the potential at the point (A) of the collector becomes lowered to nearly 0 V (at the time, the Q202 is kept at "OFF").
As a result, the base voltage of Q201 decreases through the R264 so that this transistor will eventually be turned on, thereby applying the voltage to the point (B). Under this condition, it is so designed that a current is applied to the motor in the direction from the point (B) to (A): the result is that the motor can rotate in such a way as to make the volume be changed from "MIN" to "MAX".
The motor is stopped as soon as the switch SW201 (UP) is moved to "OFF" from "ON" position.
- In the case of DOWN position:
When the switch SW202 (DOWN) is set at "ON", the resultant current is applied to the motor in the direction from the point (A) to (B) which is reverse to that in the case where the switch SW201 (UP) is set at "ON", so that the motor rotation can make the volume be changed from "MAX" to "MIN".
- In the case of the volume control being set at "MAX" position:
The switch electrically interlocked with the volume control is set at "Maximum End" position, a potential of 24 V is applied via the common terminal to the

R271 so that the Q206 will be turned on while the Q204, off: the result is that the motor doesn't tend to rotate even if the switch SW201 (UP) is set at "ON".

- In the case of the volume control being set "MIN" position:

The switch electrically interlocked with the volume control is set at "Minimum End" position, and the Q205 is turned on while the Q203, off: the result is that the motor doesn't tend to rotate even if the switch SW202 (DOWN) is set at "ON".

- In the case of the two switches UP and DOWN being depressed at the same time:

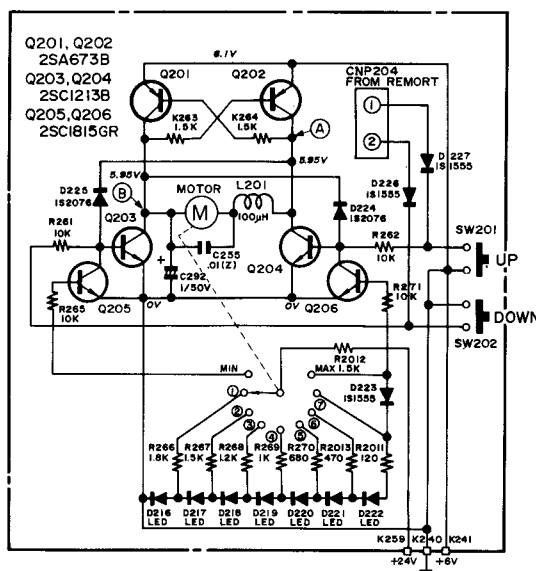
Even if one tries to push these two switches just simultaneously, it is inevitable that there will arise a slight time lag between them to be pushed. Therefore, one of the two which has been pushed first is sure to be turned on and another, kept off: the motor can thus rotate depending upon only one of the two switches.

■ Indicator Circuit

The volume control is electrically interlocked with the seven switch terminals No. 1 to No. 7 and these terminals are further coupled to the seven LED's which will light up over the range from "MIN" to "MAX" proportionally to the degree of volume amount.

With the switch set at the position ①, a current caused at the common terminal runs through the R266 to D216 so that the D216 will light up. With the switch set at the position ②, a current produced at the common terminal flows in the R267, D217 and D216 in this order so that both the D216 and D217 will light up.

Since it is so designed that a current of 7 mA runs in the R266, R270, R203 and R201, there develops a voltage of 2 V at each of the D216 to D222: the result is that if all of the seven LED's light up at a time, there appears a total voltage of 14 V at the anode of D222.



1. 3. 3 Audio Muting Circuit (Refer to Figure 15)

- When the stand-by switch is set at "ON", a current runs via the R320 in the bases of Q301 and Q302 so that these transistors are turned on. As a result, the signal of the tone control amplifier formed by the IC205 and IC206 is stopped to be applied to the input terminal of the power amplifier consisting of the IC301 and IC302.
- When the power switch is set at "ON", a current flows in the R324 and C315 and the base voltage of Q303 therefore increases progressively until this transistor will be turned on, resulting in a collector current of it. Accordingly, there arises more dropping of the voltage at the R320 so that the collector voltage of Q303 becomes negative and simultaneously a current running in the bases of Q301 and Q302 is stopped: the result is that these transistors Q301 and Q302 are both turned off allowing the signal to be passed on to the power amplifier IC301 and IC302.
- When the stand-by switch is set at "OFF", the negative voltage at the C347 is made 0 V sharply so that the emitter voltage of Q303 increases and the collector voltage thus becomes positive to generate a current

to run in the bases of Q301 and Q302: the result is that these two transistors Q301 and Q302 are turned off so that no signal enters the power amplifier. The Q304 is for the purpose to make the charged voltage at the C315 be discharged when the standby switch is set at "OFF".

- If the heat sink plate of IC301 and IC302 tends to over-heat, there develops much resistance at the PH301 abruptly, a current running from the collector to emitter of Q303 is reduced and the collector voltage therefore becomes positive so that the transistors Q301 and Q302 are turned on: the result is that any signal is prevented from entering the power amplifier thereby eliminating an excessive temperature increase of the heat sink plate.
- When the tape deck is operated in either of the modes STOP, FF, REW, APSS FW/REV, STOP/PAUSE, the signal coming out of the tape deck logic section is passed on through the K307, D331 and D332 to the Q301 and Q302 so that these transistors are turned on, thus preventing possible noises from going to the power amplifier.

1. 3. 4 Voltage Doubler Rectifier Circuit (For Strobe Illumination) (Refer to Figure 14)

When the power transformer (T_1) is at one-half cycle where its output terminal K330 is negative-related to that K331, it charges the C304 up to the AC input maximum value (E_m) through the C307. Besides, when it is at another one-half cycle where the output terminal K331 is positive-related with that K332, it charges the C346 up to the value of addition of the charge voltage (F_m) of C340 and the total AC input ($2 E_m$).

$$E_p = 2 E_m + B$$

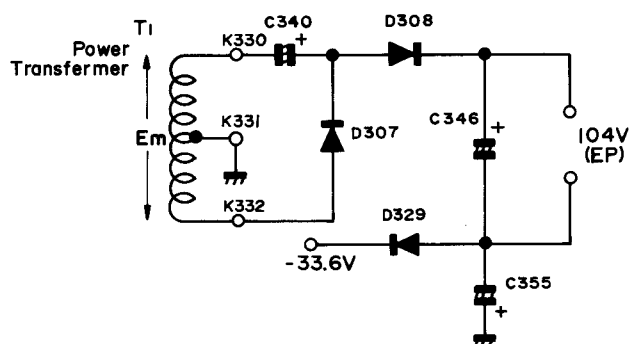


Figure 14-1

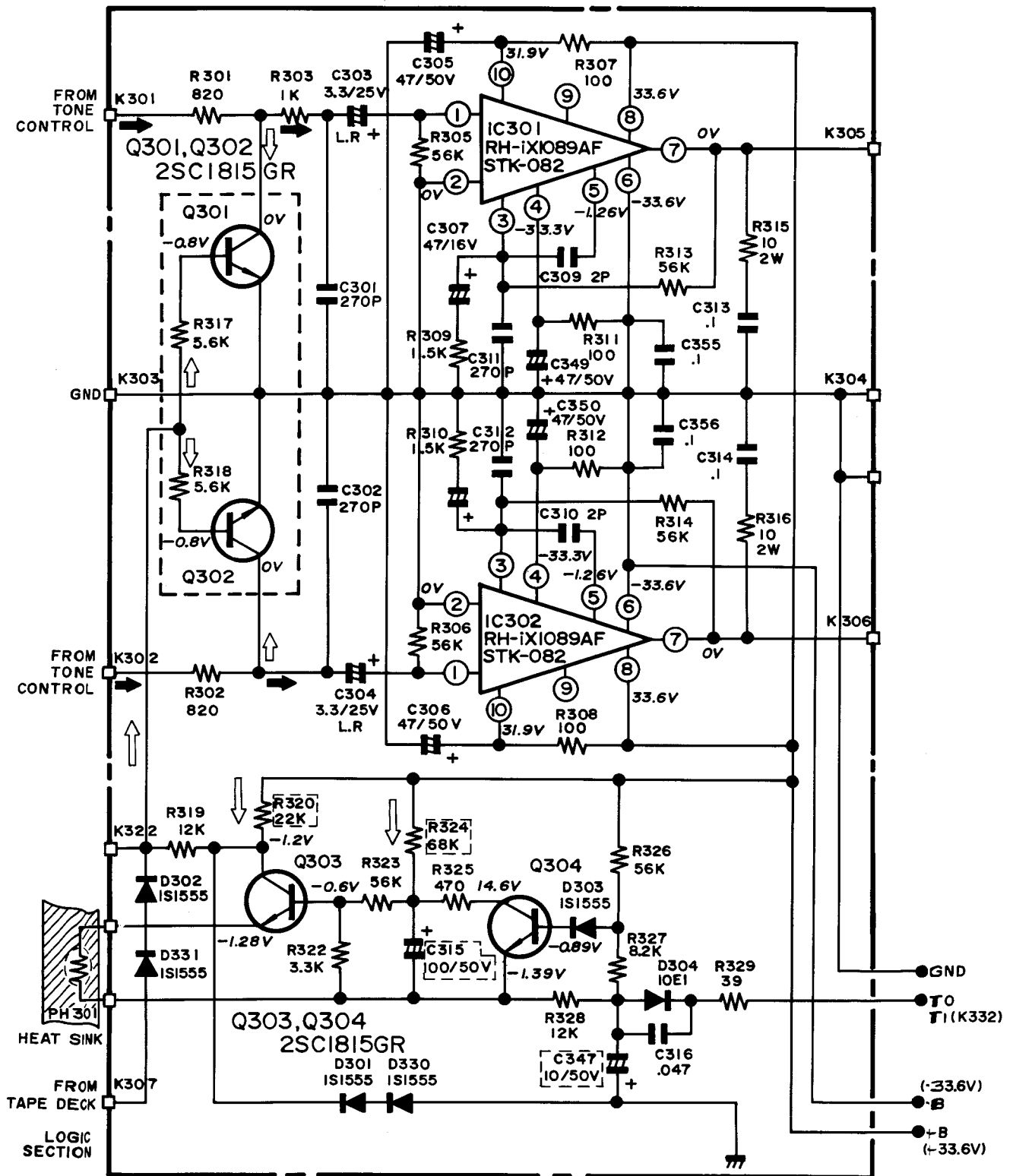


Figure 15-1

2. TUNER SECTION

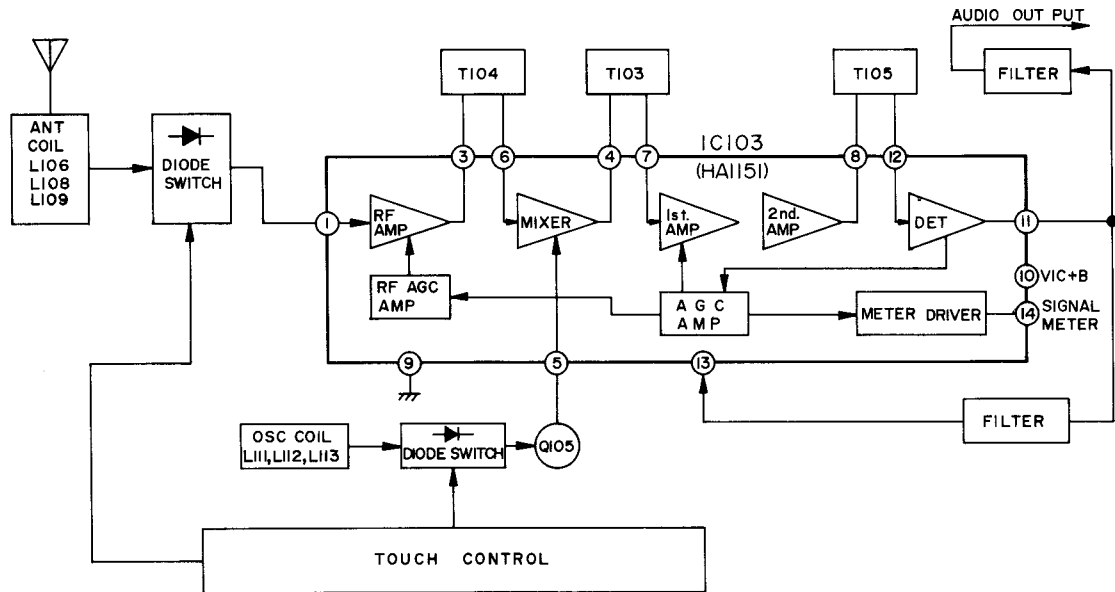


Figure 16-1

2.1 AM (LW, MW, SW) SECTION (Refer to Figure 16)

This signal selection depends upon the switching circuit making use of diode --- this diode operation is more reliable than with the mechanical-basis parts, in particular for a number of signal selections like in this type of tuner.

The fundamental of this switching is that the diode provides a sharp rise-up characteristic in the forward direction at one time and a cut-off characteristic in the backward direction at another time.

Coming out of the touch control circuit L106, L108 and L109, AM signal enables the diode switching circuit to function leading to a selection of the mode (LW, MW or SW), and then the resultant signal enters the input terminal ① of the RF amplifier IC103. The signal thus amplified by the RF amplifier is passed on through the T104 (IF trap) to the input terminal of the mixer, where the AM RF signal is converted to IF signal. The IF signal is applied via the T103 to the 1st and 2nd amplifier, then detected by the T105 (IFT coil) so that it appears at the output terminal ⑪ of IC103 entering the audio circuit through the low-pass filter.

2.1.1 AM Antenna Circuit (Refer to Figure 17-1)

In MW reception the D112 and D115 get in conduction and there develops the same AC potential as the earth at the points ① and ②. Therefore the L108 (MW antenna coil) and VC101 (variable capacitor) can form a resonant circuit resulting in a reception of MW signals (the SW antenna coil L106 at the time has no influence on MW/LW reception).

The signal thus received is applied to the input terminal ① of IC103 through the C139 and L115: the D113 and D114 are both opened allowing no signal to run therein.

This process of receiving MW signals holds true of SW/LW reception, also.

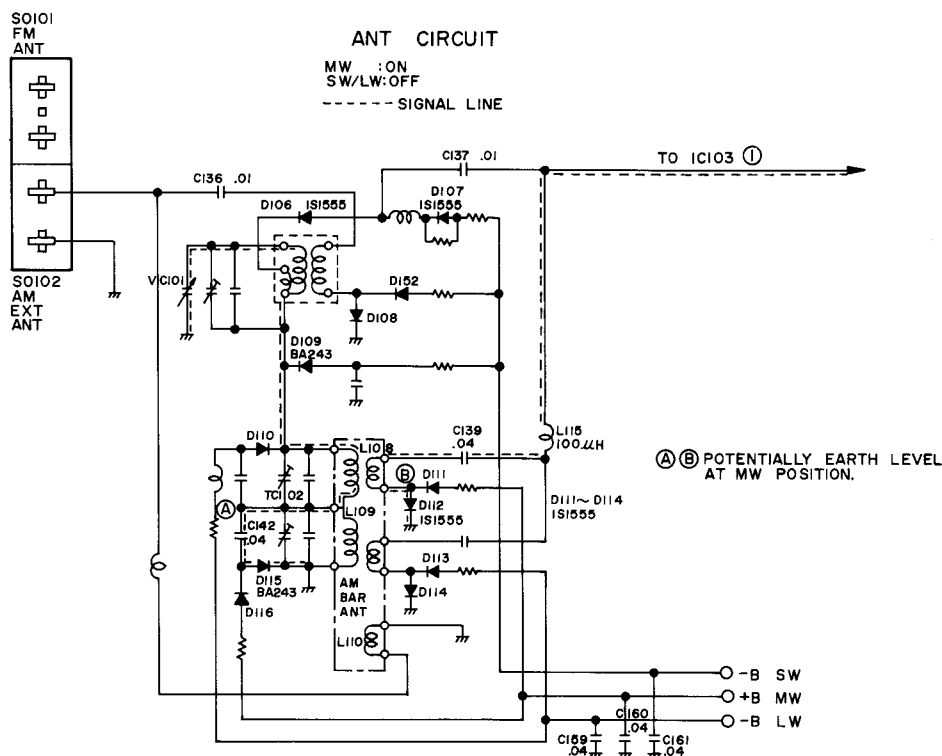


Figure 17-1

2.1.2 AM Oscillation/IF Circuit (Refer to Figure 17-2)

Switching operation by the oscillator circuit is the same as in the AM antenna circuit shown in Figure 17-1.

In MW reception, the D124 and D126 get in conduction while the D121 and D129 are kept open; at the time,

We can assume that the R156 remains open because of its higher resistance (1 M ohm). Accordingly, only the L112 becomes alive to make MW reception be feasible thanks to the diode switching operation. The D133 and D134 are so designed as to operate as a damper against the L113 during MW reception, assuring a more stabilized MW oscillation.

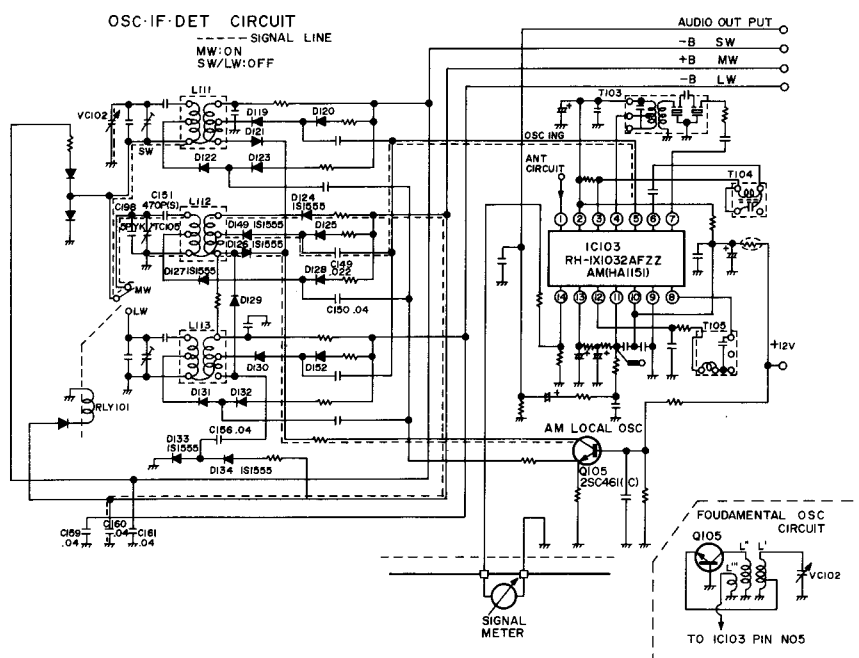


Figure 17-2

2.2 FM SECTION (Refer to Figure 18)

FM reception is based on the presettable memory function so that it is started instantly when any of the touch switches U_1 to U_7 is pushed. Coming out of the touch control circuit, the MANUAL/Channel (U_1 , U_2) selection signal is converted into the corresponding voltage by the potential meter, then to be applied to the variable capacitance diode (varicap) of the antenna/oscillator circuit. Being picked up by the antenna; RF signal is applied to the antenna circuit where the necessary component is taken out and it is then amplified by the RF amplifier. Then the signal is converted into IF signal through the mixer, further to be supplied to the IF amplifier (IC101) where it is amplified and detected and finally it is supplied to the multiplex circuit (IC102) becoming stereo audio signal to enter the audio amplifier.

The IF amplifier IC101 consists of 3-stage amplifier/limiter, 3-stage meter-driving detector circuit and quadrature detector circuit.

The 0 V switch is provided to prevent possible noises (shock noises) from occurring when the muting switch is turned on or off.

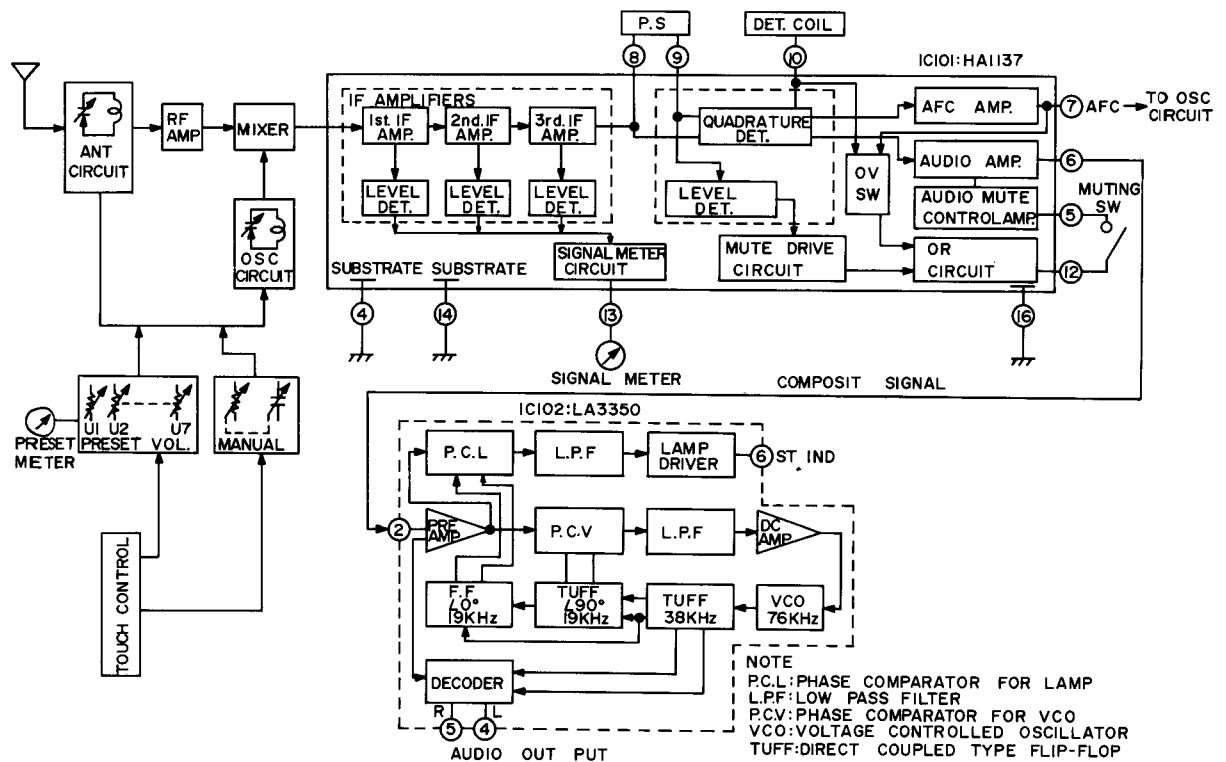


Figure 18-1

2.2.1 Quadrature Detector Circuit (Refer to Figure 19)

The phase shifter is to tune the input signal to FM carrier by shifting its phase by $\pi/2$ with respect to the central frequency. The signal (called f_o) which has thus been delayed by $\pi/2$ in its phase will be used at the quadrature detector, serving as a switching signal.

Figure 19-3 reveals how this switching operation (demodulation) is carried out.

(a) In the case of the input frequency being matched

to the f_o .

(b) In the case of the input frequency being lower than the f_o .

(c) In the case of the input frequency being higher than the f_o .

If there is found a deviation at the input frequency tuned by the phase shifter, it is subjected to FM detection.

2.2.2 PLL Multiplex Circuit (Refer to Figure 18)

Behaviors of PLL (Phase Locked Loop)

When there is a phase difference of $\pi/2$ caused between the composite signal and 38 kHz signal, the stereo separation effect attains the maximum. Generation of 38 kHz signal is based on 78 kHz signal produced at the VCO: the latter signal is applied to the TUFF where it is made to be a 38 kHz signal.

The PLL system is provided so that it makes the phase difference between the composite signal and 38 kHz signal be of $\pi/2$.

Coming in the input terminal ② of IC102, the pilot signal (19 kHz) concerned with the composite signal

is passed on through the preamplifier to the PCV where a switching operation occurs with the assistance by the 19 kHz which has been assured by the VCO. When this switching is locked, the output of PCV becomes zero and as the phase of VCO varies, the output (positive) of PCV becomes negative; this variation is amplified by the DC amplifier to control the VCO, thereby making zero the output of PCV. It is in this way that during demodulation of the stereo broadcasting signals, the input signal undergoes a 38 kHz phase control to become a switching signal to be applied to the decoder circuit.

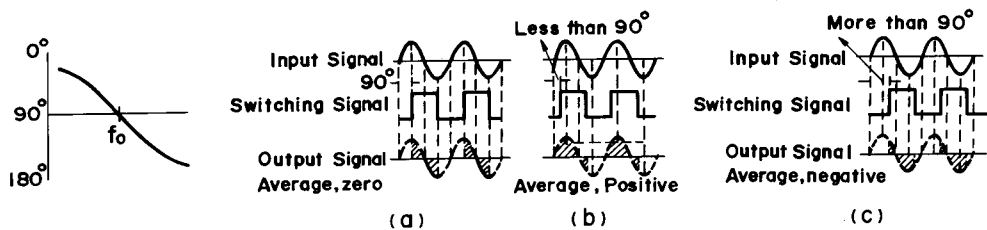


Figure 19-1

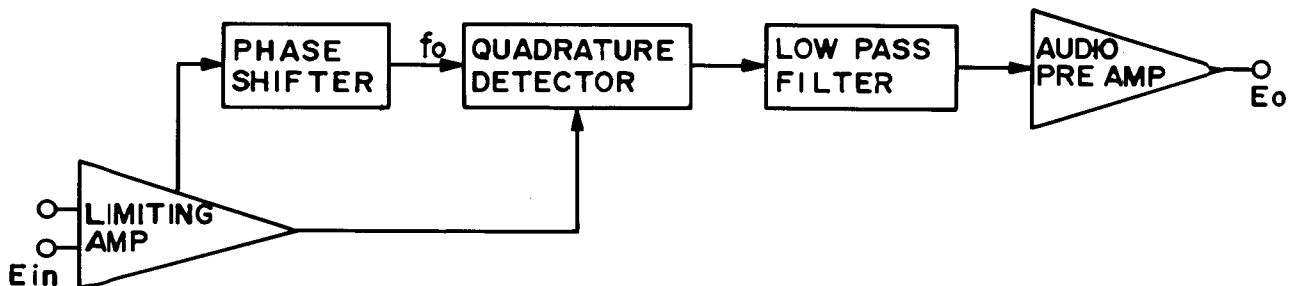


Figure 19-2

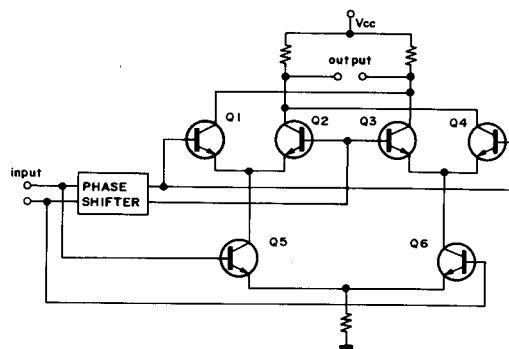


Figure 19-3

3. TAPE DECK LOGIC CONTROL CIRCUIT

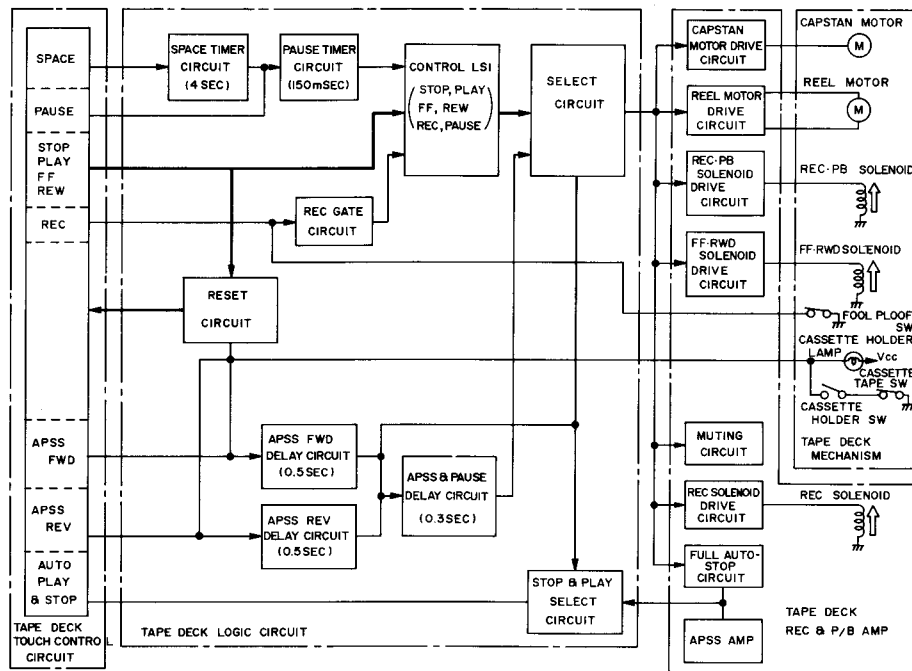


Figure 20-1

3.1 SYNOPSIS (Refer to Figure 20)

- Receiving the signal from the touch controls the logic control circuit mainly composed of the control LSI (IC415), which has a preset logic about the factors of time and sequence, is to energize the mechanical control circuit so that the tape deck gets in either of the modes STOP, PLAY, FF, REW, APSS-RWD/REV, STOP/PAUSE and PLAY/PAUSE.
- The control LSI (IC415) is to function according to either of the selected modes STOP, PLAY, REC and PAUSE: Receiving the signal from the touch control circuit, this LSI produces time-controlled signal to apply it to the select circuit. Another feature of the circuit is to prevent misoperation caused due to multiple inputs during the reception.
- The space timer circuit is so designed as to operate only when the tape deck is at REC mode; this time circuit receives the signal from the touch control circuit and delays its travel for about 5 seconds before applying it to the pause timer circuit. This time delay (about 5 seconds) is named a space time.
- The input signal to the control LSI during PAUSE mode is required to continue for more than 100 msec, as otherwise the circuit will operate mistakenly. For this purpose, the pause timer circuit is provided to enable the pulse to continue for 150 msec.
- The record gate circuit is an intermediate circuit to transfer the signal from the touch control circuit to the control LSI, regulating it to a proper level. It is noted that with an erase-proofed tape (to prohibit the recording), this gate circuit can cut off the record control signal since the fool proof switch detects the use of such a tape at that time.

The APSS FWD delay circuit is to delay the oncoming signal for 0.5 sec. in order for the other mechanisms to become free from misoperation. During REV mode, if the APSS FWD signal is generated by the touch control circuit to cancel the function of REV mode, this APSS FWD delay circuit begins to operate stopping the mechanism once and 0.5 sec. thereafter, the signal will be supplied to the APSS and PAUSE delay circuit.

- The APSS and PAUSE delay circuit is provided to serve its role when there occur APSS and PAUSE operations at the same time; say, this circuit then is to control the REC/PB solenoid and FF/RWD solenoid alternately.
- The reset circuit is to produce reset signal to apply it to the touch control circuit, which is required to change Stop/Play/FF/REW to APSS FWD/APSS REV mode and vice versa, or from APSS FWD to APSS REV and vice versa.
- The select circuit is the one by which, coming out of the control LSI and APSS and pause relay circuit, the signal is applied to the mechanism drive circuit and control circuit depending upon its purpose.
- The STOP and PLAY select circuit is designed to function during APSS mode receiving program-to-program space signal: namely, it delivers PLAY or STOP signal to the touch control circuit according to whether the tape is subjected to APSS or APF operation. Besides, it also operates when the tape reaches the end so that it receives the pulse signal from the full auto stop circuit.

3.2 CONTROL LSI CIRCUIT (Refer to Figure 21)

3.2.1 Control LSI Operation

- The IC 415 is composed mostly of C-MOS and it is made an open emitter type in order to provide much amount of output current for some output terminals (22, 21, 19, 18, 17, 16, 15). All of the input terminals (2, 3, 4, 5, 6, 7) are so designed as to function when the signal given is at low level. Fig. 21-1 represents input signal-to-output signal relation: out of those, the tape end output terminal becomes low level (off) only when it is given the signal but goes to high level each time any of the keys is pushed.
- Fig. 21-2 shows how the control LSI circuit can operate with input signal under the respective modes.
- For record operation, it is needed for the circuit to receive both REC and play input signals.

○..... High Level OUTPUT

INPUT Signal	STOP	FF	REW	PLAY	REC and PLAY	PAUSE		
OUTPUT Signal	STOP	FF	REW	PLAY	REC and PLAY	STOP	PLAY	REC/ PLAY
PLAY				○	○			
REC					○			○
STOP		○	○	○	○	○	○	○
FF REW		○	○					
PAUSE						○	○	○
MUT	○	○	○			○		
REW			○					
F.F		○						
TAPE END	○	○	○	○	○	○	○	○
MODE					REC	PAUSE	PLAY/ PAUSE	REC/ PAUSE

Figure 21-1

MODE	INPUT Signal	STOP	FF	REW	PLAY	PAUSE	REC (PLAY)
STOP		—	FF	REW	PLAY	PAUSE	REC/PLAY
F.F	STOP	—	REW	PLAY	—	REC/PLAY	
REW	STOP	FF	—	PLAY	—	REC/PLAY	
PLAY	STOP	FF	REW	—	PLAY/PAUSE	REC/PLAY	
PAUSE	STOP	FF	REW	PLAY/PAUSE	STOP	REC/PAUSE	
REC/PLAY	STOP	FF	REW	—	REC/PAUSE	—	
REC/PAUSE	STOP	FF	REW	—	REC/PLAY	—	
PLAY/PAUSE	STOP	FF	REW	—	PLAY	REC/PAUSE	

Figure 21-2

3.2.2 Timing Chart [Control LSI (IC415)]

- Fig. 21-3 shows the operation timing chart of the IC415.
- T₁ is a delay time of the output signal against the input signal which is provided for a transfer from Stop mode to Play, FF or REW mode, a transfer from Play mode to FF or REW mode, or a transfer from FF mode to REW mode. With this provision of a delay time, one mode, if transferred to another, is sure to once experience a stop condition and so there develops no mis-operation and a tape can travel with-

out a damage due to the transfer from one mode to another.

- T₂ is also a delay time (assured following the T₁) which prevents noise occurrence at Stop, FF and REW modes with muting signal, and makes the play output appear only after the tape speed has become steady. Since the capstan motor begins to function immediately with Play input, the muting is cancelled with a time delay of "T".

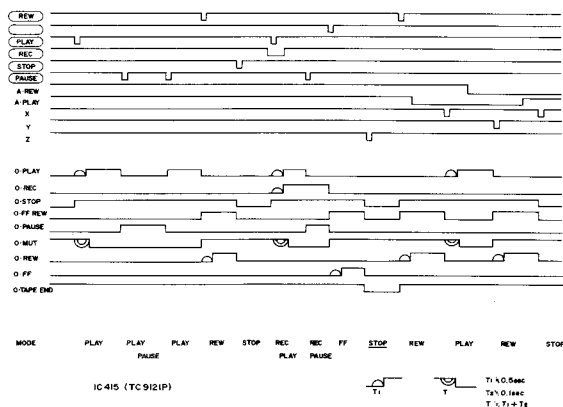


Figure 21-3

3.3 Relation between Operation Mode and Mechanism

—— (Refer to Figure 22)

Referring to Fig. 22, we will next explain how the mechanical parts operate in each operation mode. In this figure, you will find the parts such as ① wind solenoid, ② capstan solenoid, ③ reel motor, ④ supply reel support, ⑤ wind roller, ⑥ take-up reel support, ⑦ capstan, ⑧ idler, ⑨ pinch roller, ⑩ record/playback head, ⑪ erase head and ⑫ sub-chassis.

A. At Stop mode:

All the drive parts are in stop and the wind roller ⑤ becomes in contact with the supply reel support ④ and take-up reel support ⑥ to brake them.

B. At Play mode:

As soon as the play key is pushed, the capstan (capstan motor) begins to rotate and 0.5 second after that, the capstan solenoid ② will move to activate the wind roller ⑤, idler ⑧, pinch roller ⑨ and subchassis ⑫ resulting in a playback condition shown in the figure. This process holds true of the record/playback mode, also.

C. At FF mode:

When the FF key is pushed, 0.5 second thereafter the reel motor rotates in a normal direction so that the wind solenoid ① moves to make the wind roller ⑤ get in contact with the reel motor shaft: the result is that the reel motor shaft, with its rotation, will make the wind roller get in contact with the take-up reel support to rotate.

D. At REW mode:

When the REW key is pushed, 0.5 second thereafter the reel motor ③ rotates in a reverse direction so that the wind solenoid ① moves to make the wind roller ⑤ get in contact with the supply reel support to move.

E. AT Stop/Pause mode:

When Stop mode is changed to Pause mode, the capstan solenoid ② first start to move so that the set gets in once Play mode before reaching Pause mode: however, the capstan motor at that time is kept in a stop. 0.3 second thereafter, the wind solenoid ① begins to move and simultaneously the capstan solenoid ② is reset. With the wind solenoid in action, the record/playback head ⑩ and erase head ⑪ are stopped in contact with the tape's surface, because of the subchassis ⑫ not returning to a normal position for Stop mode.

F. At Play → Play/Pause mode:

If the pause key is pushed under Play mode, the wind solenoid ① begins to move and simultaneously the capstan solenoid ② is reset. With the wind solenoid in action, the record/playback head ⑩ and erase head ⑪ are stopped in contact with the tapes' surface, because of the subchassis ⑫ not returning to a normal position for Stop mode.

Meanwhile, if the pause key is pushed under Play/Pause mode, the capstan solenoid ② begins to move and simultaneously, the wind solenoid ① is reset to provide Play mode.

G. At APSS FWD mode:

When the APSS FWD key is pushed, the capstan solenoid ② begins to move 0.5 second thereafter so that the set gets in a condition the same as in Play mode: however, the capstan motor is kept in a stop. 0.3 second thereafter, the reel motor ③ starts to rotate in a normal direction, the wind solenoid ① gets in action and simultaneously the capstan solenoid ② is reset. The wind solenoid is to make the wind roller ⑤ be in contact with the reel motor shaft: the result is that the reel motor shaft makes, with its rotation, the wind roller be in contact with the take-up reel support to get in rotation. Besides, the record/playback head ⑩ and erase head ⑪ are stopped touching the tape's surface because of the subchassis not tending to return to a normal position for Stop mode.

H. At APSS REV mode:

When the APSS REV key is pushed, the capstan solenoid ② begins to move 0.5 second thereafter so that the set gets in a condition the same as in Play mode: however, the capstan motor is kept in a stop. 0.5 second thereafter, the reel motor ③ starts to rotate in a reverse direction, the wind solenoid ① gets in action and simultaneously the capstan solenoid ② is reset. The wind solenoid is to make the wind roller ⑤ be in contact with the reel motor shaft: the result is that the reel motor shaft makes, with its rotation, the wind roller be in contact with the supply reel support to get in rotation. Besides, the record/playback head ⑩ and erase head ⑪ are stopped touching the tape's surface because of the subchassis not tending to return to a normal position for Stop mode.

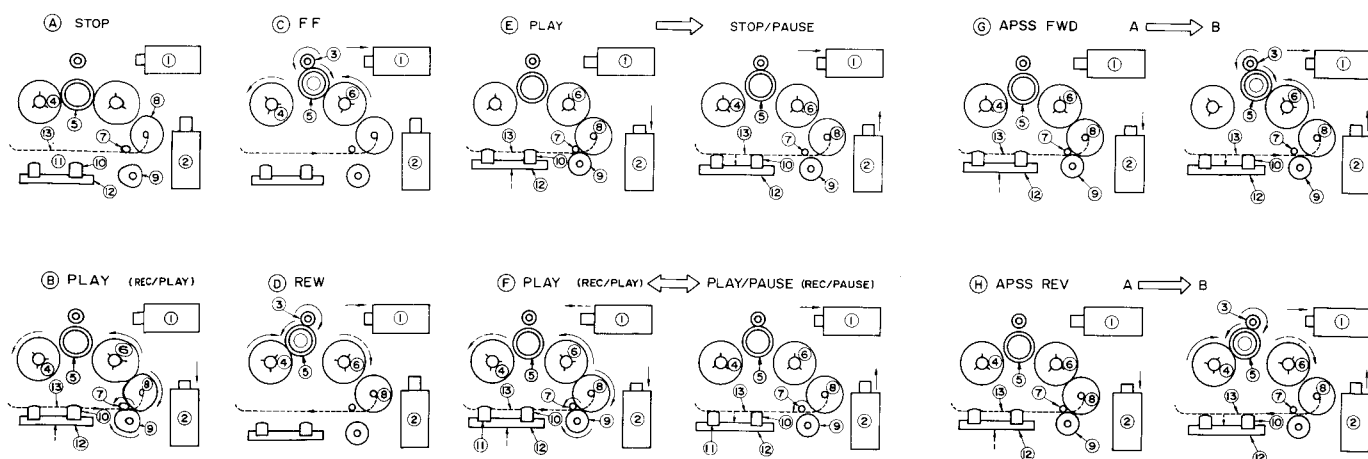


Figure 22-1

3.4.3 APSS FWD Delay Timer Circuit

(Refer to Figure 24-1)

The APSS FWD delay timer circuit is provided to delay the oncoming signal for a certain time when Stop, Play, FF or REW mode is changed to APSS mode so that the corresponding mechanisms become free from misoperation.

Coming from the touch control circuit, when a low-level signal is applied to the input terminal ① of IC

408, the signal appearing at the output terminal ② of IC413 (A) is made to be at low level for a certain time T_3 through a current charged by the C411 and R414, so that the signal appearing at the output terminal ③ of IC410 (A) is delayed by t_3 to become low level.

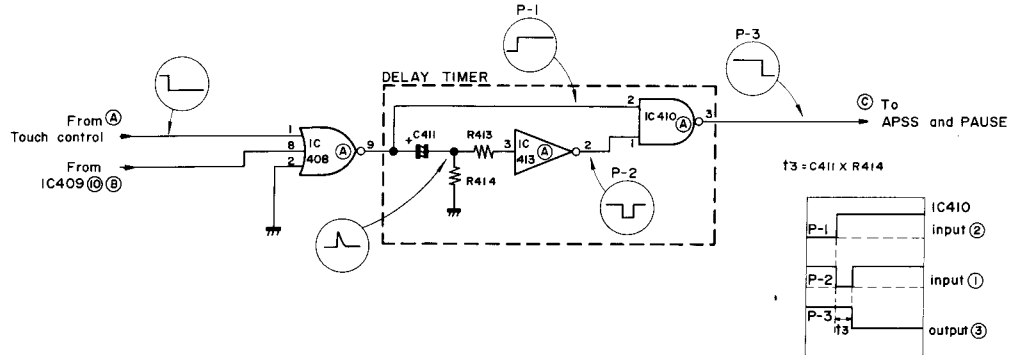


Figure 24-1

3.4.4 Delay (APSS/Pause) Circuit (Refer to Figure 24-2)

Coming from the APSS FWD delay circuit, when a low-level signal is applied to the input terminal ① of IC413 (D), the signal appearing at the output terminal ② of IC413 (E) is made to become low level as shown in Fig. (P-4) for a certain time t_4 through a current charged by the C414 and R421. Meanwhile, the signal at the output terminal ⑩ of IC410 (C) is delayed by T_4 to become low level and that at the output terminal ③ of IC409 (A) is delayed by t_4

to go to high level. It is in this way that going out of the output terminals ④, ⑤, ⑥ and ⑦, the signals are supplied to the respective mechanisms drive circuits to activate the APSS FWD circuit.

The same process applies also to APSS REV mode except for that the reel motor is to rotate in a direction reverse to that in APSS FWD mode. As for Pause mode too, the same operation holds true of it except for that there develops no reel nor motor drive signal.

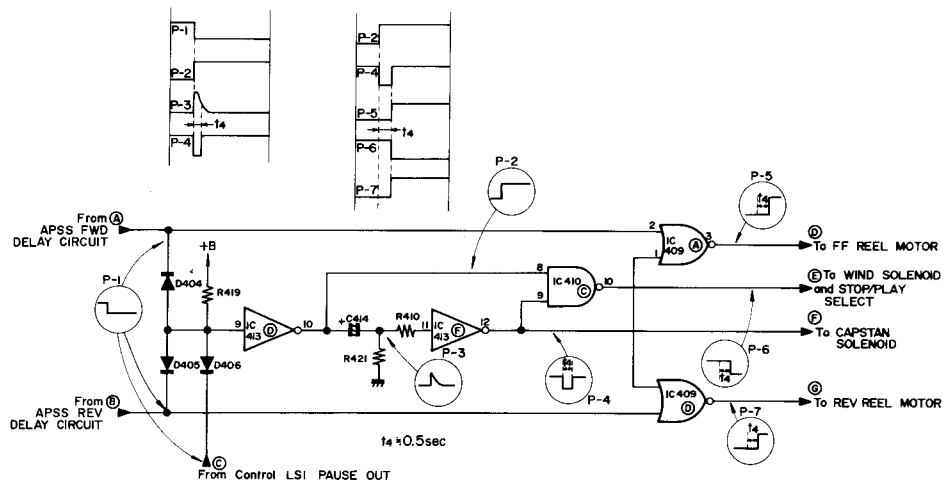


Figure 24-2

3. 4. 5 Stop and Play Select Circuit (Refer to Figure 25—1)

When a tape travels and reaches its end, the auto stop circuit begins to function generating a stop control pulse: the signal of high level is applied to the input terminal ④ to turn on the Q406, so that the high-level signal will enter the input terminal ② of IC406 (A). Then there appears a low-level signal at the output terminal ① of IC406 (A) to be applied to the input terminal ④ of IC403 (B).

Next, there develops a high-level signal at the output terminal ⑥ of IC403 (B) to be supplied, as a stop control signal, to the touch control circuit.

During when the cassette holder is open or no tape is put in the holder, it is so designed that a low-level signal is applied to the input terminal ③ resulting in that the signal appearing at the IC403 (B) is always kept at high level.

While the APSS is in action, if program-to-program space signal (of high level) is passed on to the input terminal ⑧, there appears a signal (of low level) at the output terminal ⑧ of IC403 (C) to be applied to the input terminal ⑤ of IC406 (B). Assume that the set is then at Pause mode: a low-level signal is applied to the input terminal ③ while a high-level signal, at the input terminal ⑥ of IC406 (B), so that there develops a low-level signal at the output terminal of IC406 (B). In addition, a low-level signal caused at Pause mode is supplied to the input terminal ⑨ of IC406 (C) and there appears a high-level signal at the output terminal ⑩ to be applied, as a stop control signal, to the touch control circuit via the IC406 (A) and IC403 (B).

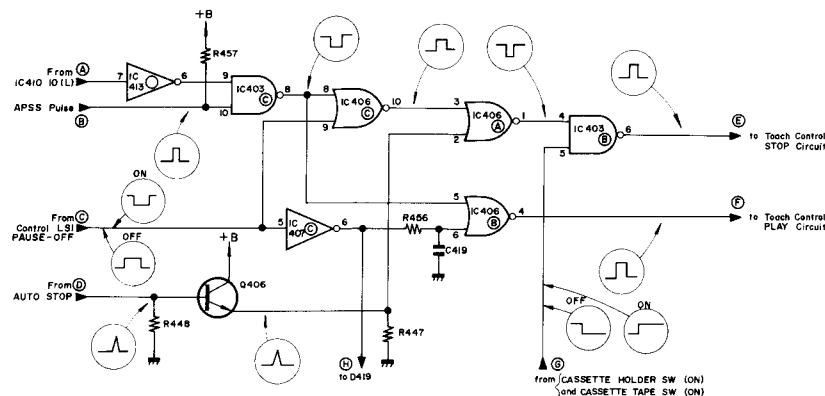


Figure 25—1

3. 4. 6 REC/PB Solenoid and FF/RWD Solenoid Drive Circuit

(Refer to Figure 25—2)

In order to drive the solenoid according to each mode, it is needed at an initial stage at the driving to keep voltage supply at a fairly high level and to thereafter maintain it at a proper level not causing an abnormal temperature increase at the succeeding processes. It is at Play mode that coming from the logic control circuit, the Record/Playback solenoid control signal (of high level) is applied to the Q544 via the R658 so that this transistor is turned on. Then a current charged by the R640 and C601 runs in the Q534 so that this transistor is turned off for 0.5 sec. With the Q534 thus turned off, the Q533 and Q532 are both turned on so that a power of 30 V is impressed on the Record/Playback solenoid for 0.5 sec. via the D518 and Q545.

Next, the Q546 is turned on through the R657 and as

a result, the Q545 is also turned on so that there arises, in turn, a power of 10 V through the Q542 and D526: this is caused 0.5 sec after a generation of the said power of 30 V.

The same process holds true of the FF/RWD solenoid drive circuit, also.

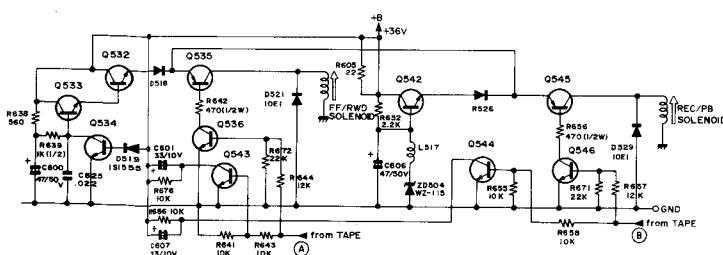


Figure 25—2

3.4.7 Full Auto Stop Circuit (Refer to Figure 26-1)

- Under Stop and/or Pause mode, coming from the tape deck logic control circuit, when a low-level signal is applied to the Q547, this transistor is turned off while the Q521 is turned on through a base current coming from the R618. Under this condition, the base voltage of R522 becomes lower than its emitter voltage and so that Q522 is kept turned off.
- When a tape starts to travel, the magnet at the tape counter is allowed to rotate to give the Hall IC a magnetic field, generating a continuous pulse. This continuous pulse is rectified by the D517 and C594 to

lower the base potential of Q522 through the D515, so that this transistor Q522 is turned off.

- When a tape reaches its end, the counter stops and the magnet also stops to rotate so that there develops no pulse at the Hall IC: the result is that the base potential of Q522 is increased through the R622 so that this transistor is turned on.

This circuit (Q522 and Q523) is an astable multivibrator circuit by which pulse signals are passed on through the R662 to the stop/play select circuit inside the logic control circuit.

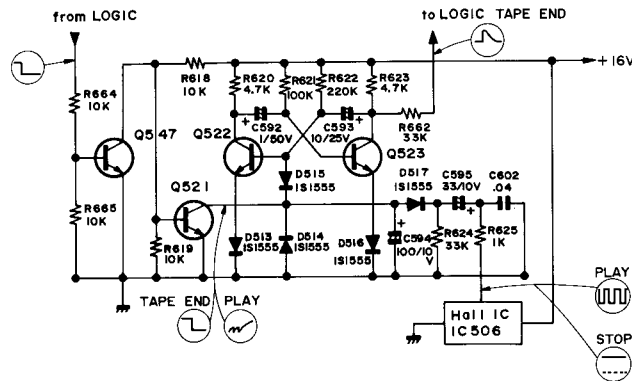


Figure 26-1

3.4.8 REC Solenoid Control Circuit (Refer to Figure 26-2)

Coming from the logic control circuit under Record mode, when a low-level signal is applied to the REC solenoid control circuit the Q540 is turned on while the Q534, off: simultaneously, the Q541 becomes free, through the D523, from an influence by the Q538 and the Q541 is turned on for 0.3 sec through a current charged by the C605 and R651. In addition, with the Q538 turned off, the Q537 is turned on so that a power of 8 V is created through the D522 to be applied to the REC solenoid.

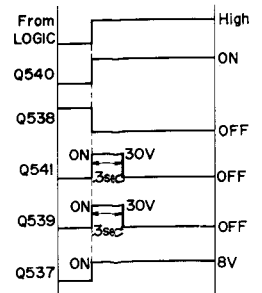
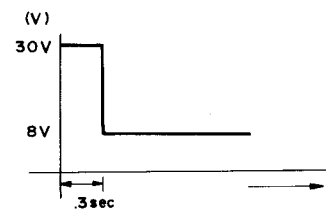
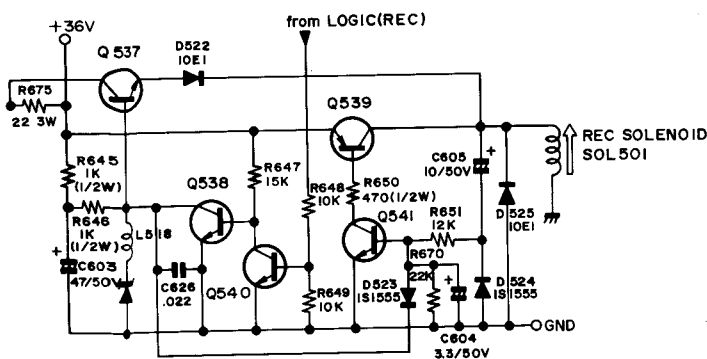


Figure 26-2

3. 4. 9 Reel Motor Control Circuit (Refer to Figure 27-1)

During when the set is at REW and/or APSS REW mode, the Q528 and Q529 are both turned on through the R634: simultaneously, the Q526 is turned on through the R631, so that there arises a drive current to run in the Q526, L521, motor, L520 and Q529 in this order, resulting a reverse rotation of the reel motor.

In the case of FF and/or APSS FWD mode, a drive current runs in the Q527, L520, motor, L521 and Q525 in this order resulting in a normal rotation of the reel motor.

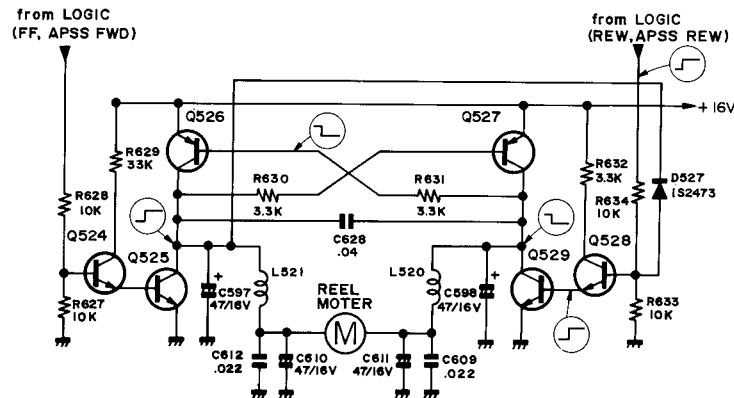


Figure 27-1

3. 4. 10 Capstan Motor Drive Circuit (Refer to Figure 27-2)

The capstan motor is so designed as to rotate when the set get in Play, Play/Pause, REC/Play and/or REC/Pause mode.

Coming from the tape deck logic control circuit, when a high-level signal is applied to this capstan motor drive circuit, the Q530 and Q531 are both turned on so that there arises a drive current to run in the L522, motor and Q531 in this order.

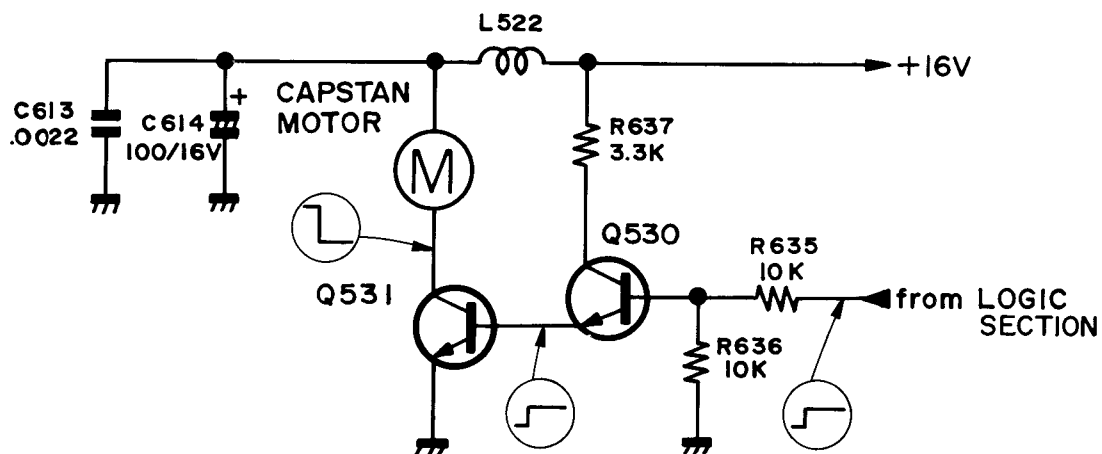


Figure 27-2

4. TAPE DECK REC/P.B. AMPLIFIER

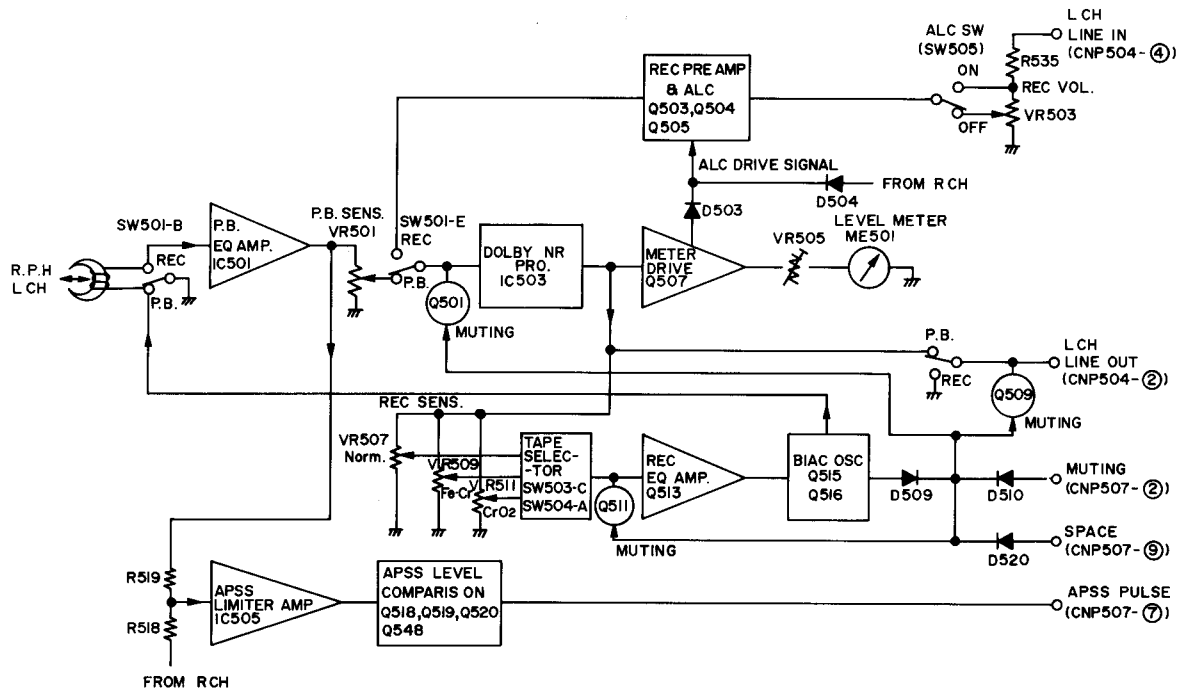


Figure 28-1

4.1 SYNOPSIS (Refer to Figure 28)

- Coming out of the Q507 (meter drive), a part of the signal becomes ALC drive signal during Record mode to be applied to the variable attenuator composed of Q504: this attenuator is driven into conduction when the ALC is turned on.
- Being amplified by the playback equalizer amplifier, both-channel signals are integrated into one signal by the R519 and R518, then to be, after being amplified by the IC505, applied to the APSS level comparison circuit which is to detect whether there has been a presence of a program itself or a program-to-program space: if the program-to-program space is detected, there develops a pulse to be transferred to the tape deck logic control circuit.
- The muting circuit is provided to control the Q501, Q509 and Q511 to create a muting effect for such purposes as that: (1) possible noises will be cut off during Stop, FF, REW, Stop and/or Pause mode, (2) no playback will be caused during APSS mode and (3) no sound will come out for a while under Play mode until the tape traveling speed has become steady. This circuit is also useful when preparing a 5 seconds space between programs of a tape which won't be recorded even under Record mode.
- The tape selector switch is to change over bias current and erase current, or to select record/playback equalizer characteristic and record sensitivity according to a normal, Fe-Cr or CrO₂ tape to be used.

4.2 CIRCUIT EXPLANATION

4.2.1 Playback Equalizer Amplifier (Refer to Figures 29-1, 2)

- The playback equalizer amplifier is to not only amplify a feeble amount of signal coming from the playback head up to a specified level but also to make flat its frequency characteristic.
- In any of common tape deck, its time constant for a low-frequency range is fixed to 3180 μsec and therefore, it is only for the high-frequency range that the circuit is required to change the time constant according to the types of tapes to be used.
- The C513, R517 and R515 are to assure a characteristic peculiar to the time constants 3180 μsec and 120 μsec : another characteristic by the time constants 3180 μsec and 70 μsec is available when the R515 is shorted by the SW503A. Fig. 29-1 (A) represents a characteristic that is obtained by making inductance of the playback head and capacitance of the C503 resonate in parallel with each other.

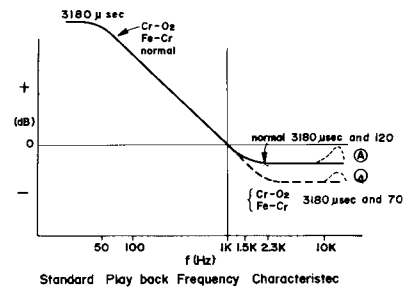


Figure 29-1-A

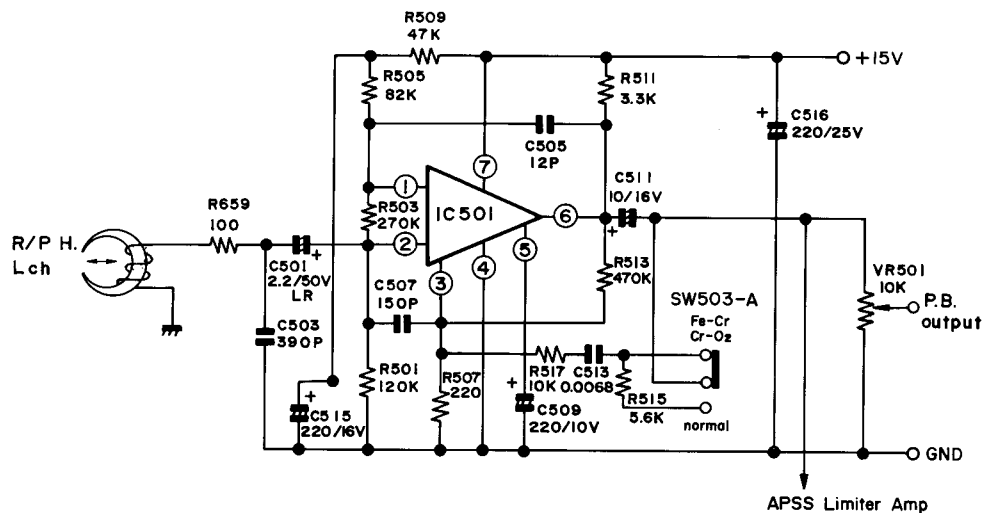


Figure 29-1-B

4.2.2 ALC Circuit (Refer to Figure 29-3)

While the ALC circuit is at "ON" position, if the incoming signal level increases beyond the limit value, the output signal level is automatically lowered so as to become always constant: the setting level is designated at a value about 3 dB lower than the rated one (0 VU). Thanks to this function, it is permitted for you to keep always a proper recording level like in the case of manual recording, even by using a music source which is very liable to vary in its level.

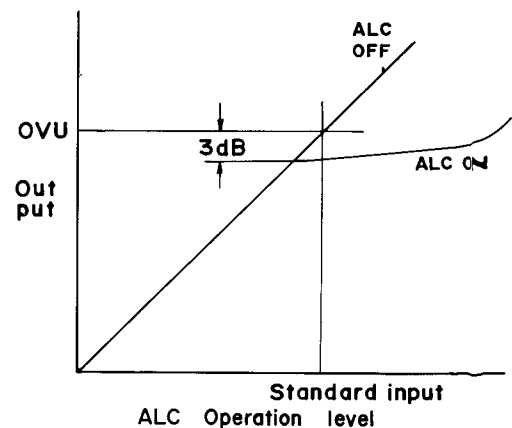


Figure 29-2

4.2.3 Dolby System

1. IC Configuration (Refer to Figure 31–1)

- Between the amplifiers A and B is connected the low-pass filter of 15 kHz. This low-pass filter serves to prevent the circuits from mis-operating possibly due to pilot signal coming from the FM tuner or record bias leaking from the tape deck amplifier. The signal coming out of the amplifier B is coupled to the record/playback switch and this signal is also applied to the input terminal α of the amplifier E. The amplifier C is a variable gain type and its frequency characteristic is shown in Fig. 30, which is like that assured by the high-pass filter. The amplifier G is to rectify a part of the signal coming out of the amplifier D and create a DC signal from this signal, regulating the variable attenuator of the amplifier C.
- The capacitors and resistors coupled with the terminals (13), (14) and (15) are to determine attack time and recovery time of the variable attenuator.

2. Basic Behavior

Tape hissing noise is the most important problem to be solved for better enjoyment of listening and to eliminate this problem, the Dolby NR system is developed enabling that a medium/high-frequency component of the said hissing noise is 10 dB boosted in recording and it, in turn, will be levelled down by the same amount in reproduction so that the resultant overall frequency characteristic be made flat. The boost circuit, called a compressor, is to adjust the boost amount according to the intensity of input signal while the level-down circuit, called an expander, to decide the corresponding level-down amount.

3. Signals Flow (Refer to Figure 31–2)

When the Dolby NR switch (SW-506) is set at "ON" position and the SW501-G and -H, at "REC" position, incoming signal is applied to the input terminal (5) of IC503, then to be subjected to frequency compensation (by the high-pass filter) and there appears a signal at the output terminal (7) to be transferred to the record equalizer amplifier.

4. Dolby NR Level

The signals for both Record and Playback modes must be the same in their level in order for the Dolby NR system to provide a normal operation: for this purpose, the potential level at the terminal (3) of IC503 is designated at 580 mV (the allowable errors ± 1 dB). To ensure this value at any mode, the semi-variable resistor (R505) is provided to adjust playback or record sensitivity: actually, the R505 is to be adjusted in such a way that the level meter will indicate 0VU when the voltage at the terminal (3) is set at 580 mV.

5. Included Parts and their Roles

- Input/output coupling: C523, C547, C549
- Power-supply decoupling: R553, C526
- Coupling of the amplifiers D and G: C529
- DC cutting: C535, C537
- The R559 is a resistor which is provided to keep always constant the IC internal phase characteristic even with any amount of load applied to the playback output terminal.

Dolby NR System (Refer to Figure 32)

- The Dolby NR system is so designed as to reduce so called tape hissing noise: this noise refers to both a tape-proper including noise and a bias noise which is additionally generated at the time of recording.
- As to fortissimo part of the recorded signal (shown in Fig. 32–3–A), its hiss noise level and desired signal level are far apart each other and so the resultant noise is not so strong as to be noticeable for the listener (this means a good S/N ratio assured). But for the pianissimo part, both levels are fairly close to each other (this means an inferior S/N ratio resulted) and the resultant noise in playback becomes noticeable.

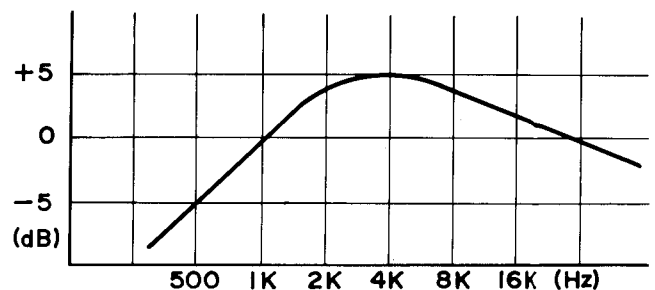


Figure 30–1

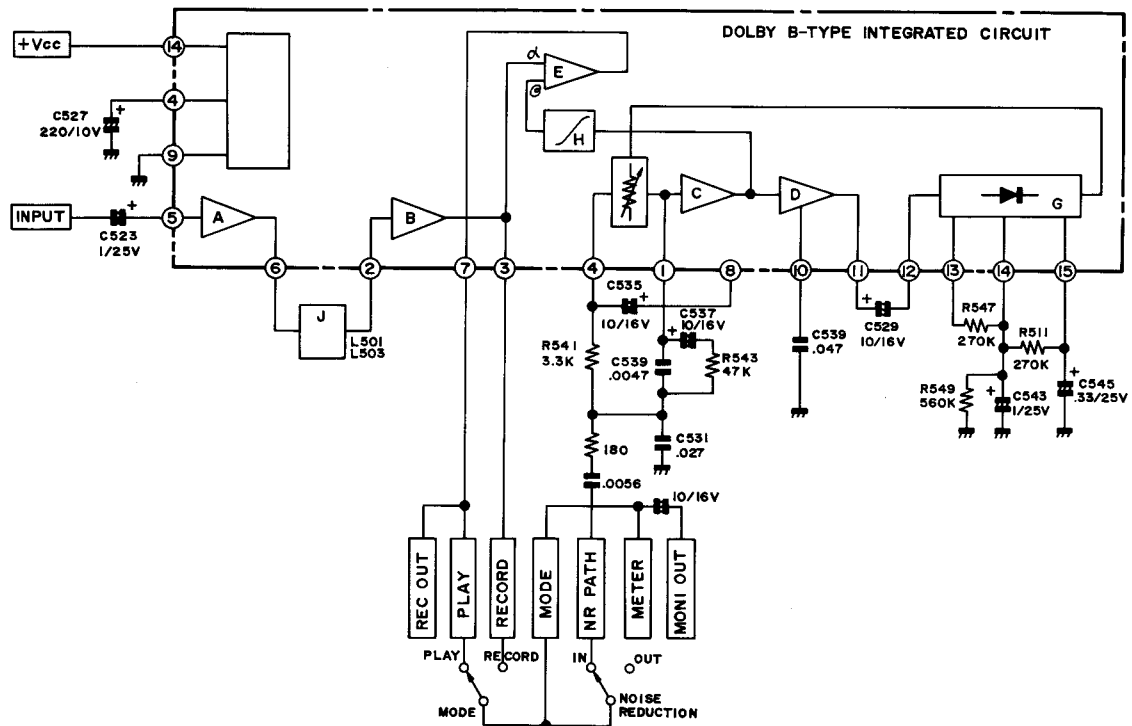


Figure 31-1

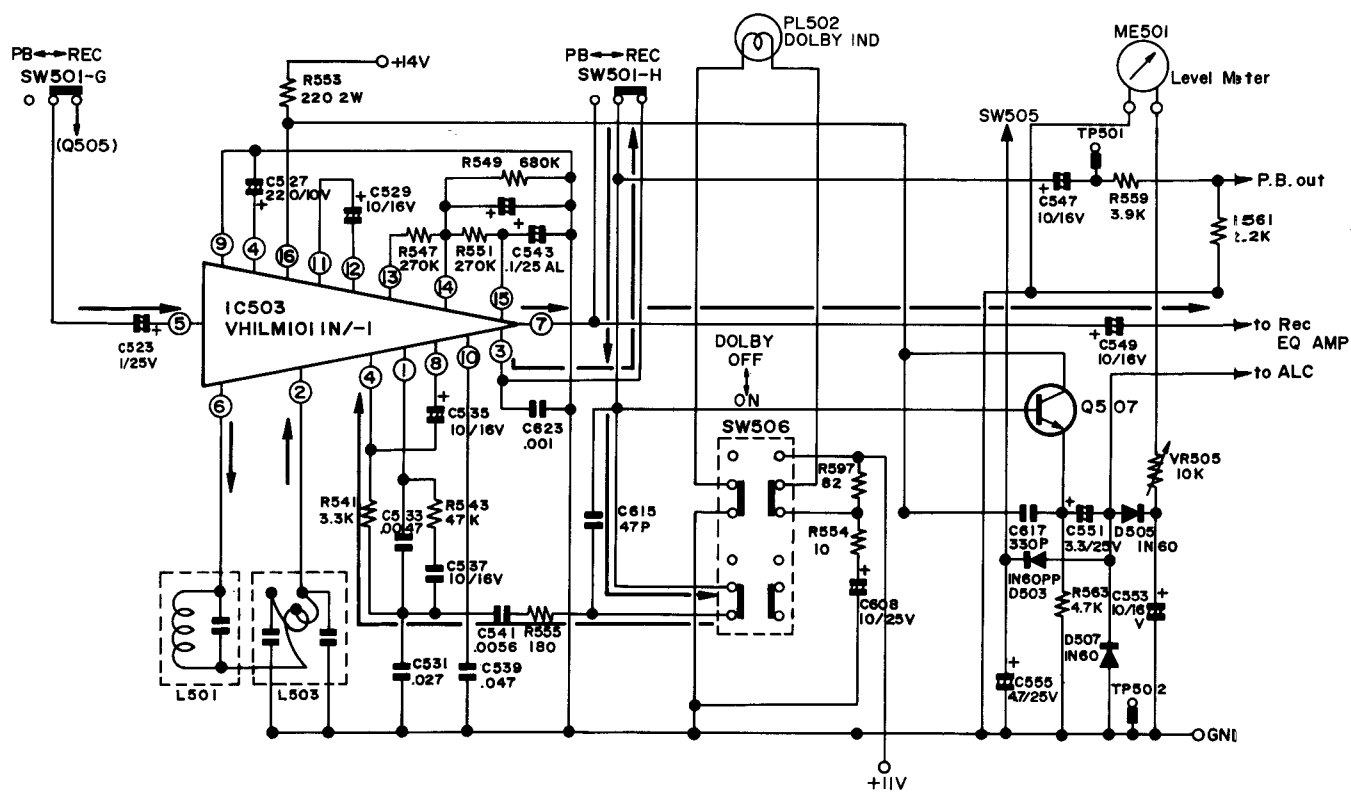


Figure 31-2

- To solve this problem, it is so designed that only the pianissimo part is boosted in its level as shown in Fig. 32-3-B., when recorded: the result is that there will be more difference between the noise level (maintained as before) and the desired signal level.
- In playback, the pianissimo part is levelled down at the same amount as in recording, as shown in Fig. 32-3-C, so that the noise level is also lowered giving rise to an increase of S/N ratio.
- As shown in Fig. 32-4-A, the Dolby NR system is to put its effect for only the range of more than 500 Hz but not for all the range of other frequencies.
- It is, in addition, noted that the compressor and expander are so designed as to adjust their output level variously according to differences of the input level and frequencies (of more than 500 Hz).
- In the case of record mode (Refer to Figure 32-1)
 - (1) Being amplified by the amplifier 1, the signal is divided into the two: one is applied to the amplifier 2 and another to the high-pass filter via the REC/P.B switch.

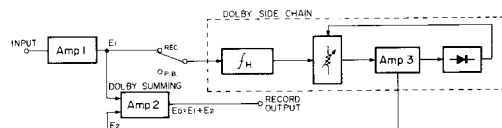


Figure 32-1

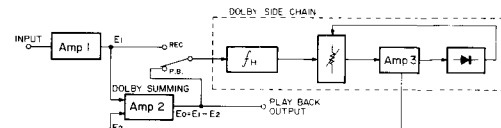


Figure 32-2

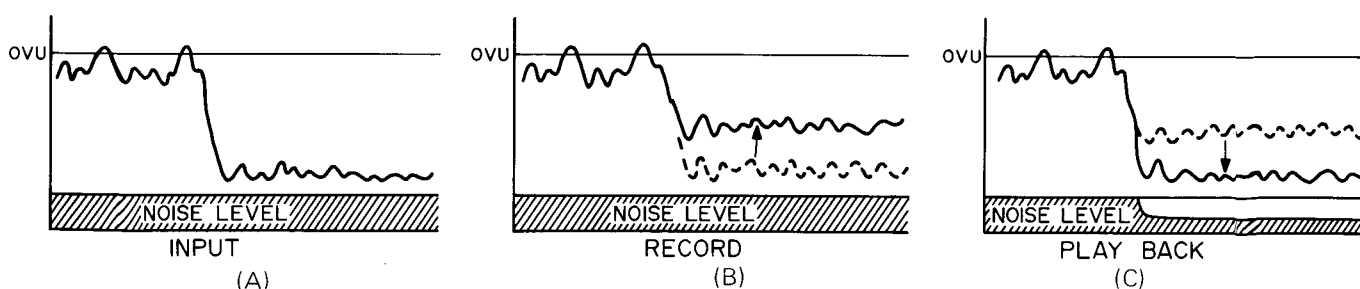


Figure 32-3

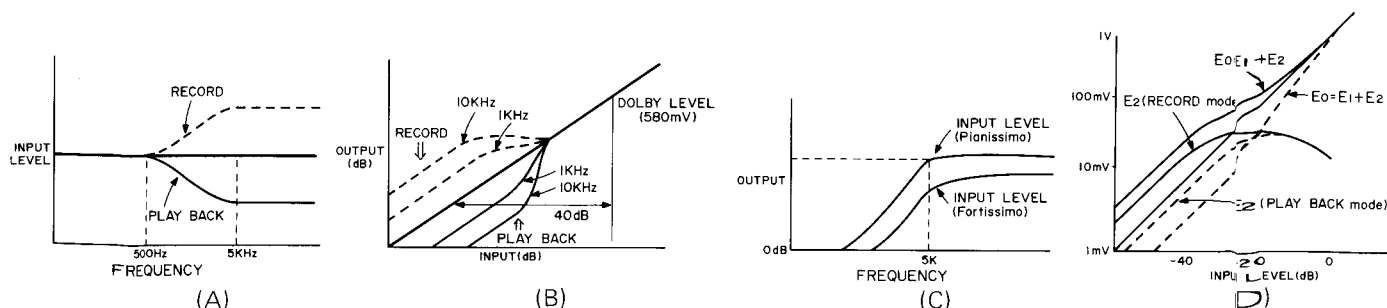


Figure 32-4

- (2) The high-pass filter is to allow the signal of more than 500 Hz to be passed therein to be transferred to the succeeding circuits.
 - (3) Passing through the high-pass filter, the signal is applied to the attenuator and then to the FET gate: this attenuator is controlled by the signal which has been amplified and rectified by the amplifier 3 and therefore, there develops more amount of attenuation as the input signal (voltage control signal) is increased in its intensity.
 - (4) Combination of the filter, attenuator, amplifier 3 and rectifier circuit is called a Dolby-side chain (shown in Fig. 32-4-C).
 - (5) The output signal of the Dolby side chain is applied to the input circuit of the amplifier 2 where it is combined with that of the amplifier 1.
 - (6) Input to and output of the amplifier 2 are made reverse to each other in their phase: this is achieved by so-called Dolby summing circuit.
- In the case of playback mode (Refer to Figure 32-2) There develops the signal having a characteristic reverse to that in the case of record mode.

4.2.4 Record Preamplifier (Refer to Figure 33)

- It is so designed that the signal coming from each source (controlled by the mode selector) is once levelled down by the attenuator before reaching this record preamplifier: this is for the purpose to improve various factor of such as signal level, load resistance and distortion under ALC mode. Only after that, the signal is applied to the record preamplifier having a gain of about 17 dB where it is amplified up to the original intensity then to be transferred to the next-stage Dolby processor circuit. When the ALC is kept at "OFF" position, the signal which has been attenuated by the R536 and VR504 is subjected to only the amplification by the Q504.
- The variable attenuator is constructed as shown in Fig. 33-1.
To the attenuator formed by the R536 and VR504 are coupled the collector and emitter of Q504: when the base current is increased or decreased, the collector-to-emitter impedance Z varies accordingly, resulting in a variation of the total amount of attenuation.

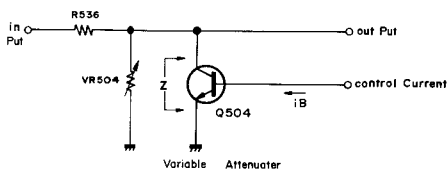


Figure 33-1

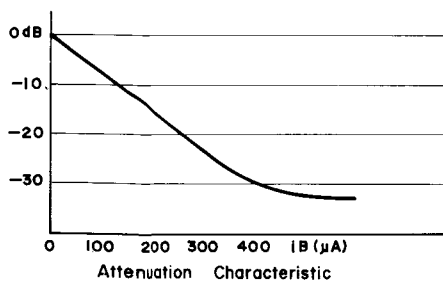


Figure 33-3

- Speaking of attenuation characteristic of this circuit, the attenuation amount increases to some extent as the base current (I_B) is increased gradually, but it stops to increase and remains at the same level if it exceeds such a limited point: this condition means that the impedance (Z) is well saturated.
- Coming from the meter drive circuit, DC signals (for both channels) are applied to the D503 and D504 where they are forced to become a composite signal. This DC signal is then DC-amplified by the Q503 to drive the Q504 in conduction. The R524 serves to limit the amount of a current running in the Q504, and the R525 is, together with the R526 (for R-channel), to make the base current of Q504 be equally assured for both channels. The Q504 is of a package including two transistors and it is so designed, in its characteristic, as to provide the same ALC effect for both channels. The C518 is to decide attack time and recovery time of this circuit: the attack time and recovery time are designated respectively at 0.3 sec and 30 sec.

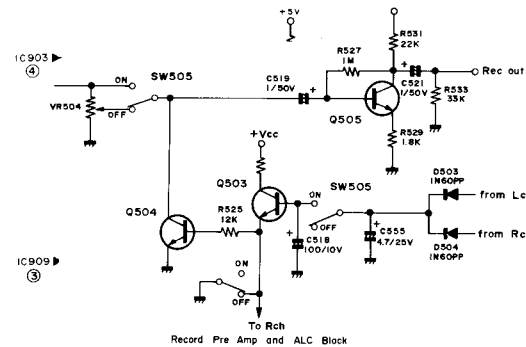
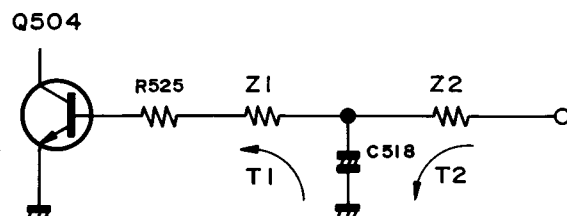


Figure 33-2



- Z1 : R525 X Q503 (AFE)
 Z2 : Impedance (Rectifier)
 T1 : Recovery Time
 T2 : Attack Time

Figure 33-4

4.2.5 Record Equalizer Circuit (Refer to Figure 34)

The record equalizer circuit is provided to give the recorded signal with an appropriate frequency characteristic and it is equipped with the independent control switches and medium/high-frequency compensator circuit meeting the characteristics of three kinds of tapes to be used: the SW-503 and SW504 are to be changed over according to these tapes.

- In Figure 34-1:
 - A; Standard playback frequency characteristic.
 - B; Frequency characteristic obtained when the sound without a magnetic head loss is played back.
 - C; All loss factors including the magnetic head loss
 - D; Synthetic frequency characteristic of C and A
 - E; Bandwidth required for the record equalizer circuit
- In Figure 34-2:

The frequency characteristic shown in this figure is to compensate for an insufficiency in the required bandwidth shown in Fig. 34-1-E.

 - A; Boosted portion in the low-frequency range
 - B; Medium-frequency range correction
 - C; High-frequency range correction
 - D; A cross-over section between the correction

characteristics C and B and this can be changed by adjusting the head or tape.

E; Boost amount adjustable range at high-frequency peaking

F; High-frequency peaking

- In Figure 34-3:
VR-507, -509 and -511; For adjusting record sensitivity

R565, R571, R675
and C619;

R576 and C561;

L505, R581 and C563:

R576;

R581;

L505 and C563;

For low-frequency range
characteristic (A)

For medium-frequency range characteristic (B)

For high-frequency range peaking characteristic (D)

For adjusting the section
"D" of Fig. C-18

For adjusting the section
"E" of Fig. C-18

For determining peaking frequency

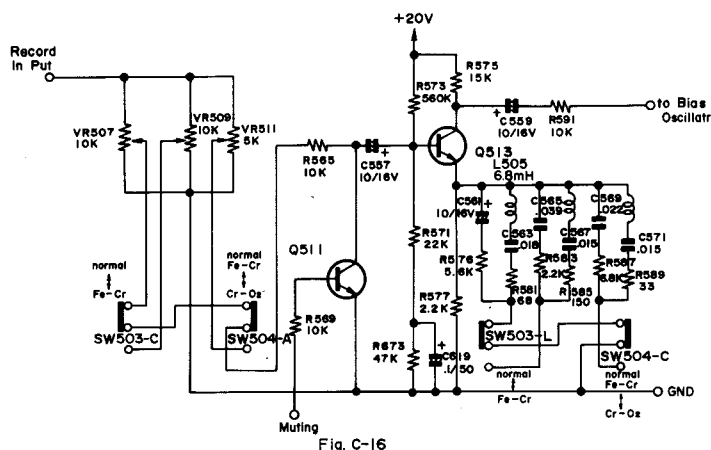


Figure 34–1

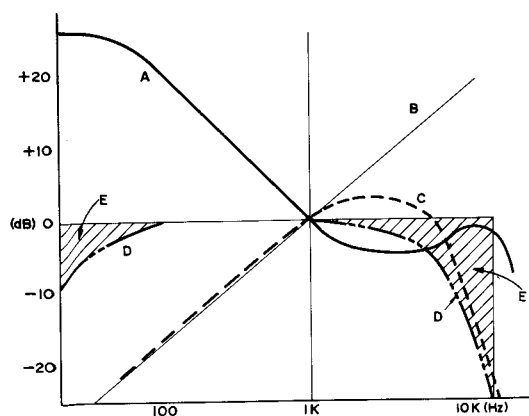


Figure 34–2

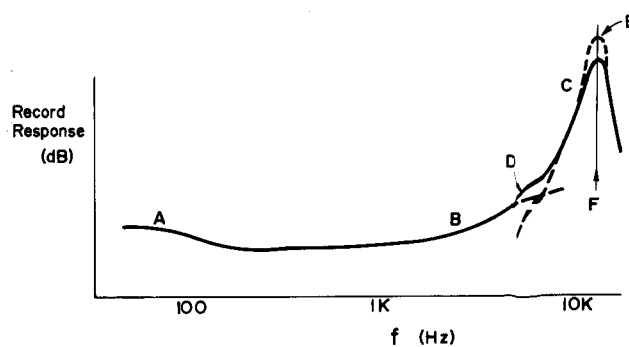
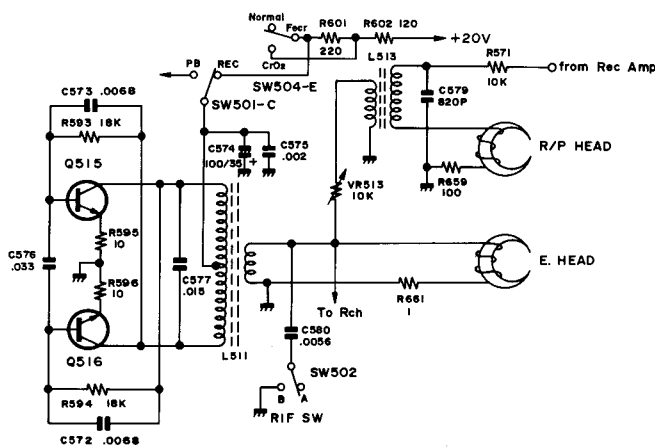


Figure 34–3

4.2.6 Bias Oscillator Circuit (Refer to Figures 35-1 and -2)

It is needed for the amount of bias current to be changed according to the types of tapes (normal, Fe-Cr or CrO₂) to be used: in addition to this, a proper amount of bias current can vary depending upon quality dispersions of the bias oscillator circuit, magnetic head, and L-ch. and R-ch. output circuits. When the SW501-C is set at "REC" position, the bias oscillator circuit begins to function: the R593 and R594 are to provide DC bias to the base while the R595 and R596, to produce a current negative feedback assuring a stable operation of the entire circuitry. The C573 and C572 form a positive feedback circuit to cause oscillation: the oscillation frequency is determined by the C577 and L511 which are to resonate with each other. The C576 is to apply a proper



4. 2. 8 APSS Circuit (Refer to Figure 36)

Coming out of the playback equalizer amplifier, composite signal of R-ch. and L-ch. is applied to the IC505 to be amplified: the required band-width is from 1 kHz to 50 kHz.

The signal thus amplified by the IC505 is voltage-double-rectified by the D511 and D512 so that the Q518 is turned on while the Q519, off. When the tape reaches a part having no signal the Q518 is turned off while the Q519, on, however. At the time, there arises a current charged by the R614 and C591 lowering the base potential of Q520, so that this transistor Q520 is turned off in an instant: a pulse is thus caused to be applied, as APSS signal, to the logic control circuit.

The Q548 is so designed as to be kept on during Play and Record modes, which prevents APSS signal (pulse) from occurring. The Q518 and Q519 are a level comparator circuit.

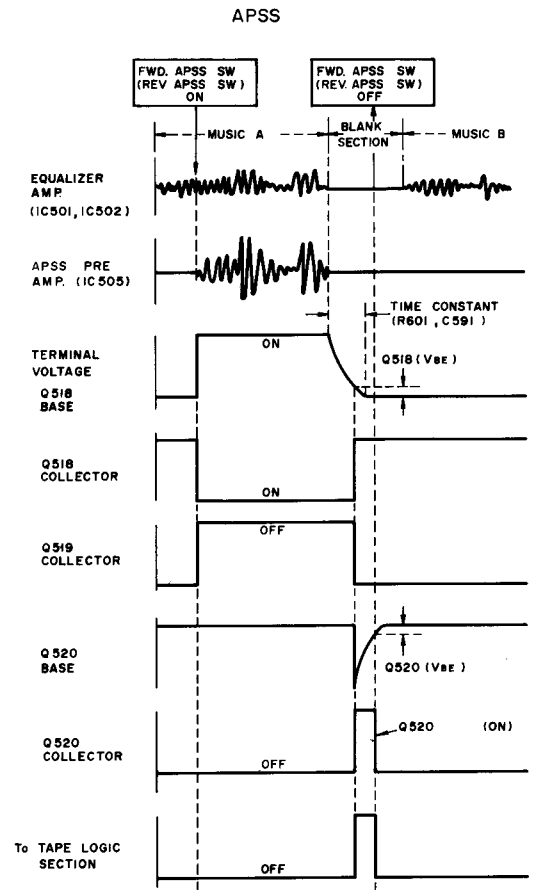


Figure 36-1

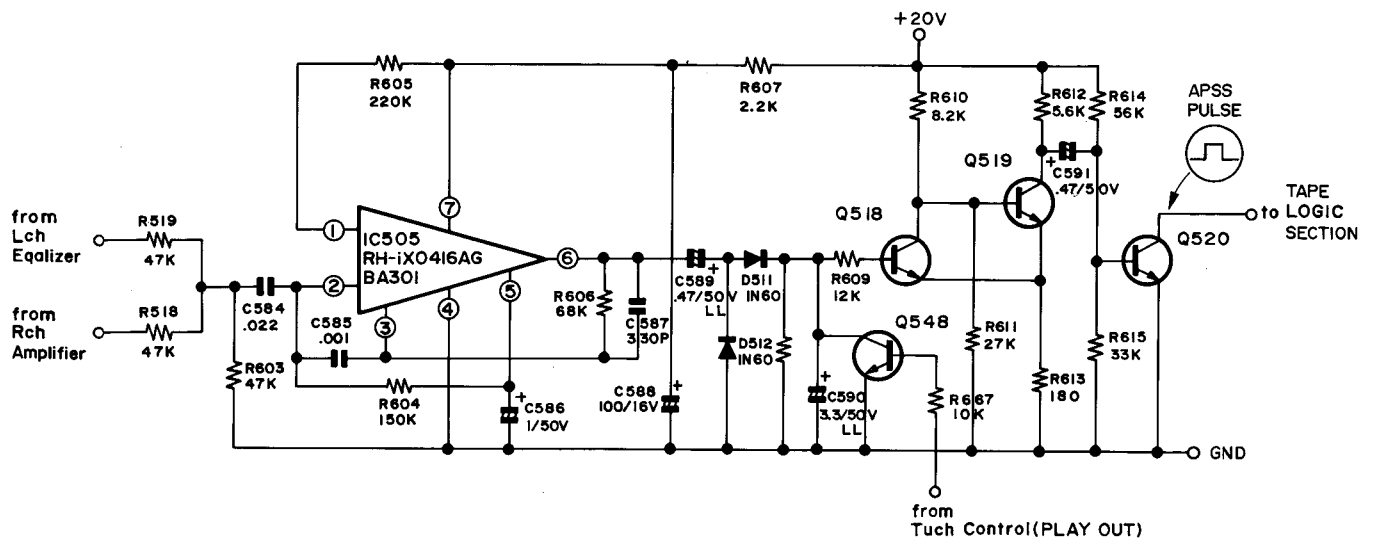


Figure 36-2

5. TOUCH CONTROL CIRCUIT (Refer to Figure 37)

5.1 SYNOPSIS

- This model SG-500H features the following function switches and control switches which are all of so-called touch sensor system: different from the conventional mechanically-operated ones, these switches can be effected only with too light finger-touch operation thanks to the employment of newly developed touch sensor IC's and electrodes (LED included).
- ON/STAND-BY
- FUNCTION SELECTOR
MIC/AUX, PHONO, TAPE, FM, SW, MW, LW
- CONTROL BUTTON
PHONO-PLAY, CUT, REPEAT
TAPE-STOP, PLAY, RWD, FF, PAUSE, SPACE,
RECORD, APSS REV, APSS FWD
- FM PRESET
U1 ~ U7, MANUAL
- With the auto play system employed, the set is permitted to automatically start playing as soon as the

function selector is set at "PHONO" and/or "TAPE" position. On the other hand, if the setting of the function selector is changed from "PHONO" and/or "TAPE" to other positions, the set automatically stops playing, getting in Stop mode.

- The configuration of the touch control circuit is as shown in Fig. 37. In this figure, it is the power on/stand-by circuit and FM preset memory that are designed to receive a drive power from the preheating circuit: this design is for a speedier operation of the succeeding circuits. These circuits get in action when the main power switch is turned on.
- Even when the stand-by switch is turned on, any of the function is not yet in selection. As to the FM preset memory, a power of 15 V is always supplied to its IC703, IC704 pin ⑦ from the pre-heating circuit, for the purpose of protecting the memorized contents.

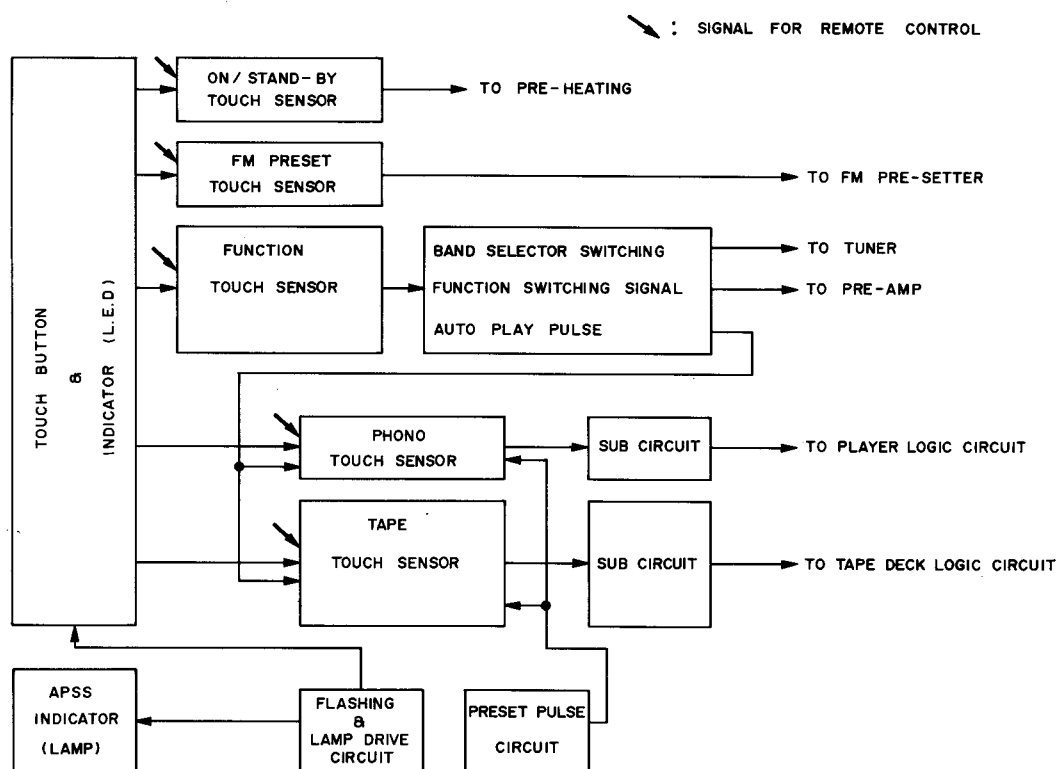


Figure 37-1

5.2 TOUCH SENSOR IC

5.2.1 Kinds of Touch Sensor IC's

Each touch sensor IC is composed of touch amplifier and latch circuit (flip-flop) : the flip-flop is to logically handle the amplified output. There are the following three kinds of IC's available according to the applications.

- 4-channel ganged type (M51232P)

The function selector switch is of this type: if any one of the functions MIC/AUX, PHONO, TAPE, etc. is selected, other functions are all turned off.

- 4-channel separate type (M54620P)

The space switch, for example, is of this type: it can be turned on and off separately without affecting other switches.

- Toggle type (M54621L)

The on/stand-by switch and repeat switch, for example, are of this type: each of this type is turned on by pushing once and off by pushing twice.

5.2.2 Touch Amplifier Circuit (Refer to Figure 38-1)

When one touches the touch plate (button), his body's resistance R_T is caused to be applied to the inner circuit and therefore a current I_B is produced to run in the base of Q_1 inside the touch sensor IC, via the R_1 and R_T . With this base current, the Q_1 is turned on and a collector current of Q_1 is then caused by the power supply V_S to flow in the base of the next-stage Darlington-coupled amplifier (Q_3 and Q_4), so that these transistors Q_3 and Q_4 are both turned on and there develops voltage (0 level) at the collec-

tor. This voltage is then applied to the next-stage flip-flop circuit or Schmidt trigger circuit.

- The required input current to activate each IC is set at $0.35 \mu A$ max.
- With a human body-induced resistance of less than 16 Mohm, the circuit is allowed to operate.
- The R_1 is to prevent higher voltage from coming in from the exterior, the CB is to prevent mis-operation due to noises and the R_2 is used for adjusting the touch control sensitivity.

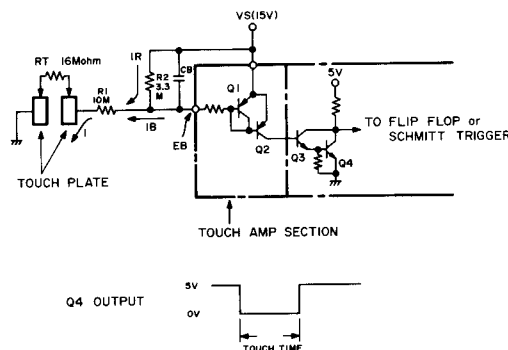


Figure 38-1

5.2.3 Output Circuit (Refer to Figure 38-2)

For any of the three kinds of touch sensor IC's, the output circuit is made an open collector type: when the selected IC gets in action, the output signal becomes low level with respect to ground level. The rated sink current is of 40 mA and the corresponding output voltage (with the signal at low level) becomes about 0.4 V max.

Channel-Lock Terminal

For any of the three kinds of touch sensor IC's, the channel-lock circuit is provided in front of the touch amplifier.

It is so designed that when this terminal is set at high level or opened, no input signal is applied to the touch amplifier: the input signal is effective as far as this terminal is at low level.

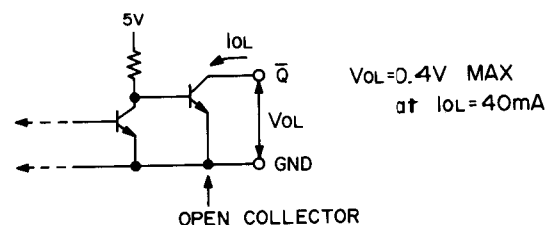


Figure 38-2

5. 2. 4 4-Channel Ganged Type (M51232P) (Refer to Figure 39-1)

Coming out of one touch button, the signal is applied to the pin ⑪ and only when the pin ⑮ is at zero (0) level, this signal is allowed to enter the touch amplifier A then to be transferred to the set input terminal of the R-S type flip-flop circuit to be held at one state: under this condition, the output Q is kept at zero (0) level. Next, coming out of another touch button, if the signal is applied to another touch amplifier, its output signal makes the flip-flop circuit be held to one state; simultaneously the common reset signal coupled with the pin ⑧ is applied to each reset input terminal of the other three flip-flop circuits to get, in turn, in reset mode.

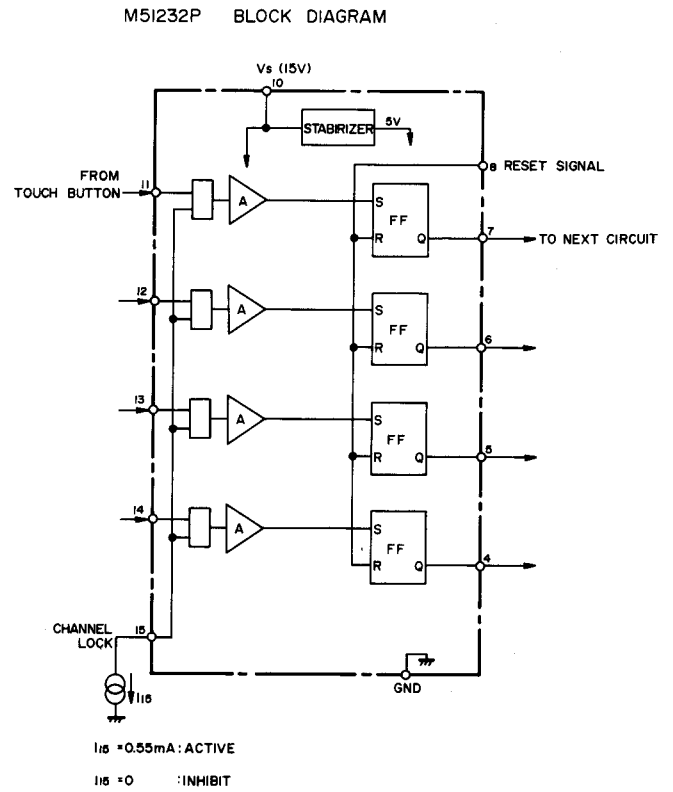


Figure 39-1

5. 2. 5 4-Channel Separate Type (M54620P) (Refer to Figure 39-2)

The space, pause, APSS REV and APSS FWD switch, for example, is this type; it can turned on and off separately without affecting other switches.

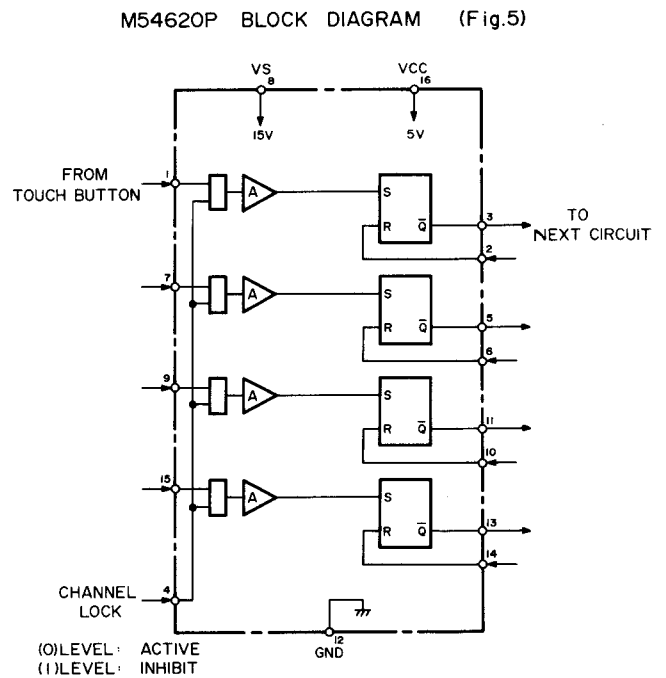


Figure 39-2

5.2.6 Toggle Type (M54621L) (Refer to Figure 40-1)

Going out of the touch amplifier, the signal is applied once to the Schmidt trigger circuit (to reduce chattering) and then to the T-type flip-flop circuit: this flip-flop is changed from one state to another every time the touch button is pushed, and in addition, note that changing of the states of the flip-flop is performed at a fall time of the $\bar{T}$ input waveform.

The T output terminal to make zero-level signal be effective only when the touch button is pushed.

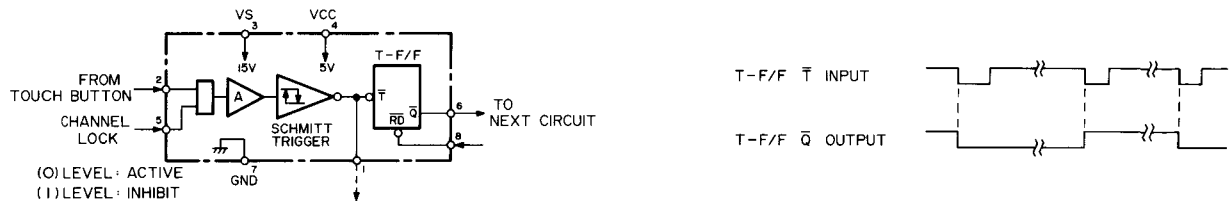


Figure 40-1

5.3 CIRCUIT EXPLANATION

5.3.1 On/Stand-by Circuit (Refer to Figure 40-2)

The behavior of this circuit is based on the use of toggle type touch sensor IC (M54631L). When the stand-by touch button is touched, a current goes out of the IC801 (2) to be applied to this sensor circuit to get in action.

The output pin (6) is turned on by touching the button once, and off by touching it twice. While the pin (6) is kept on, the PNP transistor of the auxiliary power supply section produces its base current to run in this pin (6) so that the relay is conducted turning on a main power. In Fig. 40-2, the part (1) indicated by dotted line refers to the CR filter which is to prevent mis-operation due to hum noises possibly caused when the touch button is operated, and the C828 is a capacitor to reduce chattering to the minimum. The circuit (2) indicated by dotted line is for the purpose to enable a stabilized reset operation when the auxiliary power is turned on. The R804 and ZD801 serve to apply a power of 5 V to the pin (4).

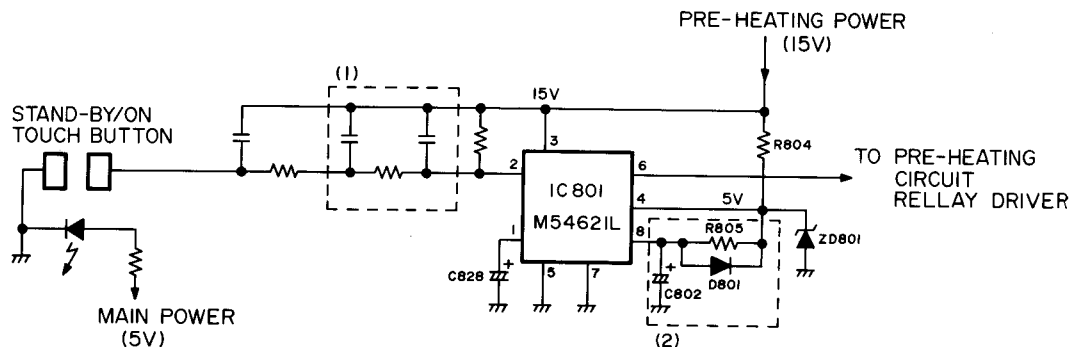


Figure 40-2

5.3.2 Function Touch Sensor Circuit and Others Concerned

(Refer to Figure 41)

This section makes use of two touch sensor IC's (M51232P).

The output of this touch sensor is passed on to each of the function switching signal circuit, auto play pulse signal circuit and band selector switching circuit. In the discussion that follows, we will explain how this section operates by taking up two examples: (1) when the PHONO button is touched and (2) when the FM button is touched.

When the PHONO button is touched, the phono channel is turned on and the output signal at the pin ⑥ of IC701 is changed from (1) level to (0) level. As a result, the base of Q801 which has been turned on is cut off so that its collector output signal is changed from 0 V to 33 V: this signal is transferred, as a function switching signal, to the preamplifier. Meanwhile, the said signal directly coming out of the PHONO button is also applied to the pin ⑫ of IC804 so that the output signal at the pin ⑫ is changed from (1) level to (0) level. At the time, there develops a signal having the pulse waveform as shown in the figure hereof so that the pin ⑩ of IC803 gets in (0) level instantly: this output signal is coupled to

the phono play touch sensor. Therefore, the pin ⑬ of the play sensor IC806 gets in (0) level and the output signal is applied to the disc player to start playing: this refers to as Auto Play System featured by the set. When the function "PHONO" is in selection, if another function button is touched, the pin ⑥ of IC701 becomes (1) level and the pin ⑫ of IC804 is changed from (1) level to (0) level, causing a pulse signal shown in the figure hereof: the result is that the pin ⑫ of IC803 gets in (0) level instantly and the output signal is applied, as a cut-off signal, to the pin ⑪ of IC806 to become (0) level.

Next, when the FM touch button is touched, the FM channel is turned on and the output signal at the pin ⑦ of IC702 is changed from (1) level to (0) level. Accordingly, the Q804 is cut off in the same way as in the above case and the collector output signal goes to high level, then to be applied to the function switching circuit of the preamplifier. Speaking of the Q805 being of PNP type, its base potential becomes (0) level so that the transistor itself is turned on and a power of 12 V appearing at the collector is supplied to the FM tuner section.

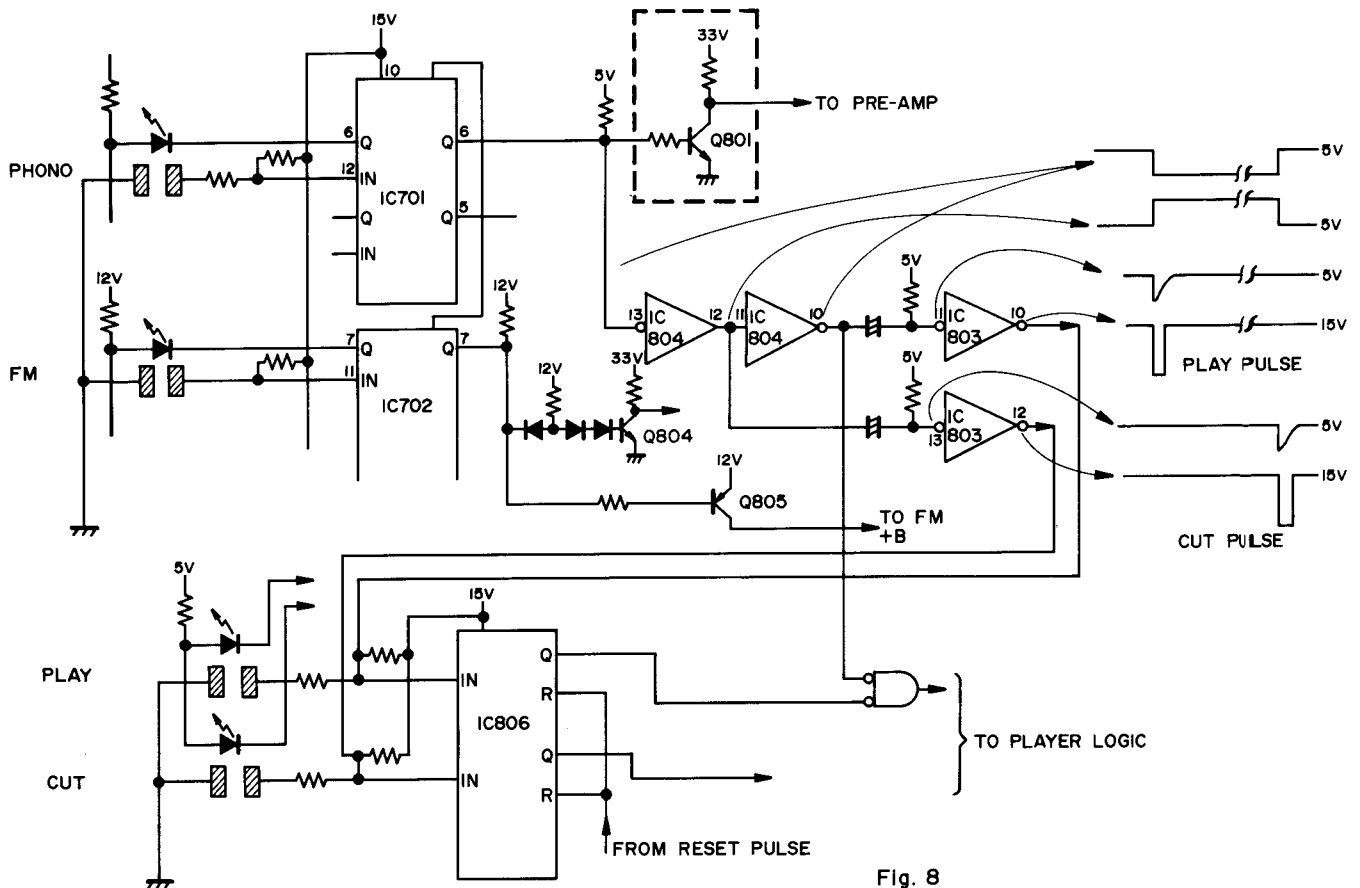


Fig. 8

Figure 41-1

5.3.3 Reset Pulse Oscillator (Refer to Figure 42-1)

This circuit is to apply reset signal to the $\overline{RD}$ terminal in each of the IC806 and IC809: it is in this way that the output signal is kept at (0) level as long as the touch button is being touched.

Output signal of the astable multivibrator composed of IC804-C, D and C-R is supplied via CR differentiation circuit to the transistor inverter where there develops negative reset pulse signal.

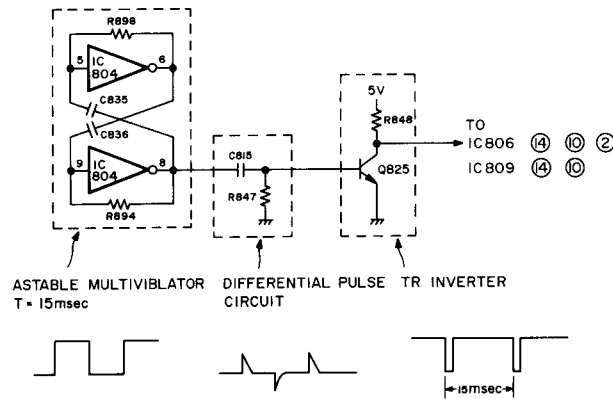


Figure 42-1

5.3.4 Flashing Signal Oscillator (Refer to Figure 42-2)

This circuit is provided to enable flashing of the repeat and pause LED indicators, and APSS REV and APSS FWD indicator lamps: the structure is of an astable multivibrator consisting of two transistors Q822 and Q823. This oscillator circuit is made always ready for the operation.

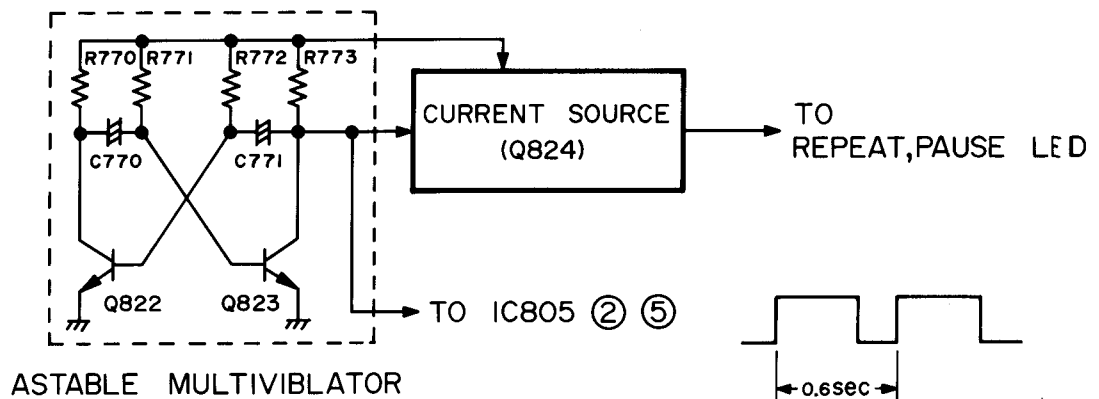


Figure 42-2

6. PLAYER

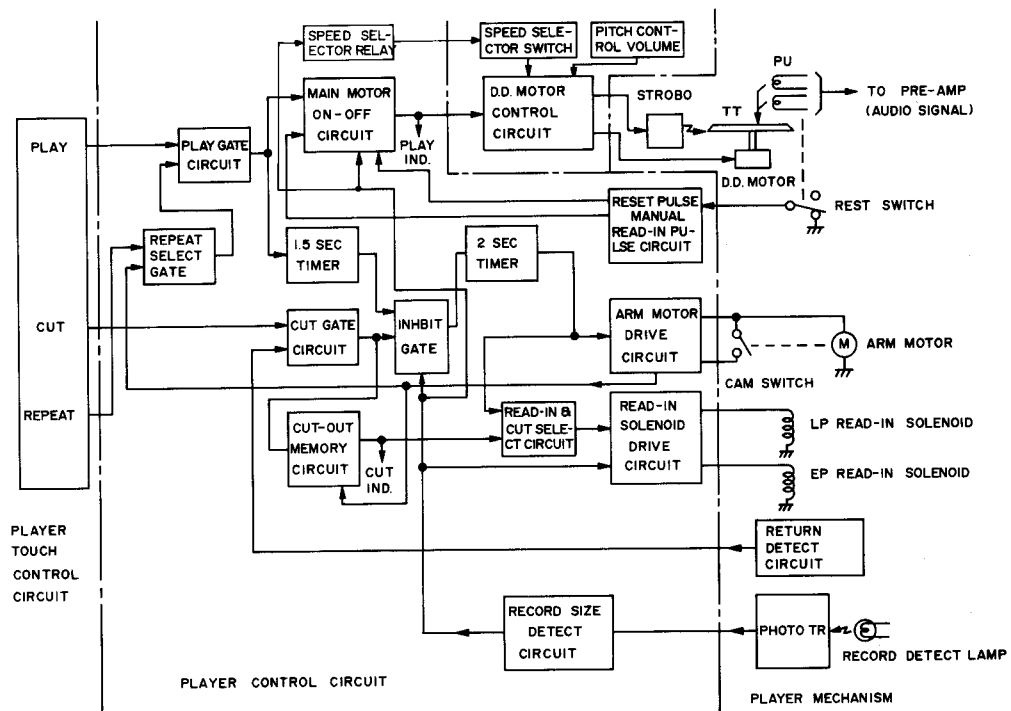


Figure 43-1

6.1 SYNOPSIS (Refer to Figure 43)

- This player is a full automatic player equipped with the control logic circuit: receiving the signals caused by touching the PLAY, CUT or REPEAT buttons, this control logic circuit is to automatically enable the said three operations and the auto-return operation.
- A mechanical feature of this player is the employment of 2-motor drive system (with an independent arm motor included).

6.2 ARM MOTOR DRIVE and SOLENOID CONTROL

(Refer to Figure 44-1)

- A disc read-in operation is the same for either LP (33 rpm) or EP (45 rpm) disc except for the moving direction of the solenoid: the arm motor and solenoid start to move simultaneously.
- The solenoid continues its action for 2 seconds.
- The arm motor continues to rotate until the read-in operation is ended.
- For the cut-off operation, only the arm motor gets in motion but not the solenoid.

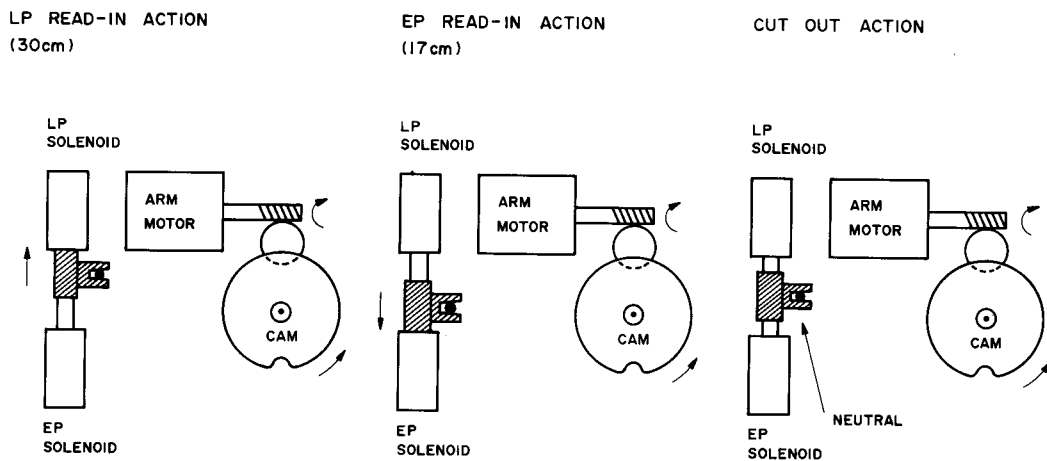


Figure 44-1

6.3 RECORD SIZE DETECT CIRCUIT (Refer to Figure 44-2)

The prism lamp, turntable's prism and photo transistor located below the turntable are to detect the size (30 cm or 17 cm) of a disc in playing or to find out an absence of it, and the output signal is applied to the control logic circuit so that a playing is stopped when no disc is placed on the turntable, and if, on the other hand, there is a disc on the turntable, the LP/EP solenoid is controlled according to said size detection

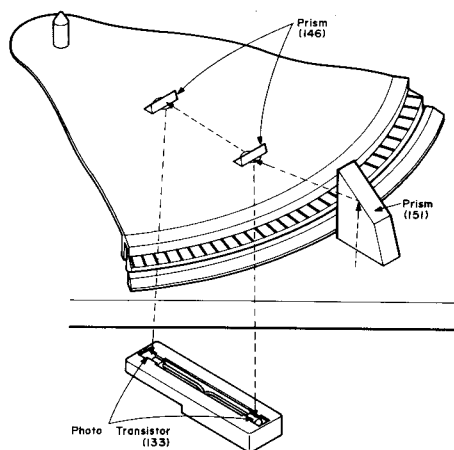


Figure 44-2

6.4 AUTO RETURN DETECT CIRCUIT (Refer to Figure 45)

(1) Arm Speed Detect Circuit

When the disc reaches nearly its final grooved part, the shutter attached to the rear of the arm tends to enter between the LED and photo transistor, and as a result, the collector voltage of the photo transistor will be changed as shown in Fig. 45-1-(A).

The voltage at the (A) is applied to the C₁ and there develops output signal shown in fig. 45-1-(B). This voltage increases as the arm moving speed becomes faster.

(2) Voltage Comparator

The reference voltage (C) is applied to the terminal (2) of IC-1 (operational amplifier) and that (B), to the terminal (3).

(3) Return Pulse Generator

The output signal of IC-1 is differentiated here to be transformed into the one (E), and this signal (E) is pulse-amplified by the TR1 and TR2 to generate pulse signal (F).

(4) Reference Voltage Selector

The output (B) is needed to vary according to LP (33 rpm) or EP (45 rpm) disc in playing and to meet this variation, the reference voltage is also changed in this section: for the 33 rpm disc, the TR4 is turned on and the RV₂ and R₁₅ gets, in turn, in a parallel connection to lower the voltage (C).

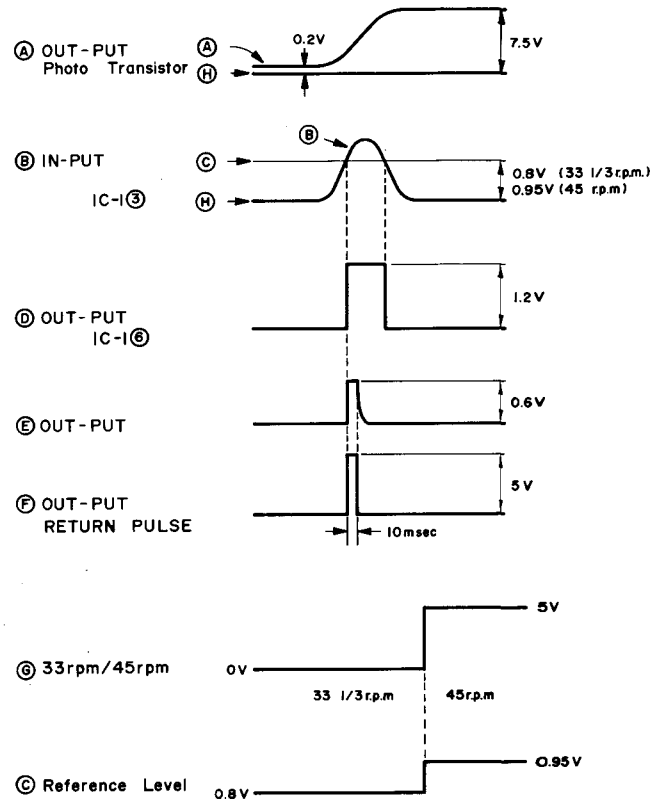


Figure 45-1

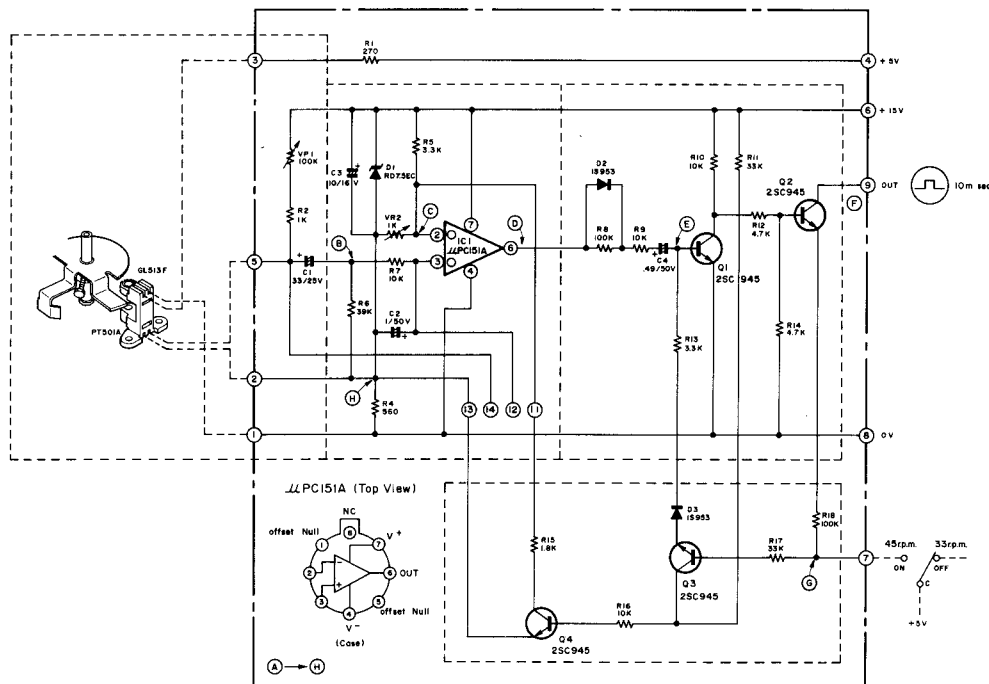


Figure 45-2

6.5 AUTO SPEED DETECT CIRCUIT (Refer to Figure 46-1)

Coming out of the record size detect circuit, the signal is applied to the 33 rpm/45 rpm speed selector relay to switch over the D.D. motor control circuit.

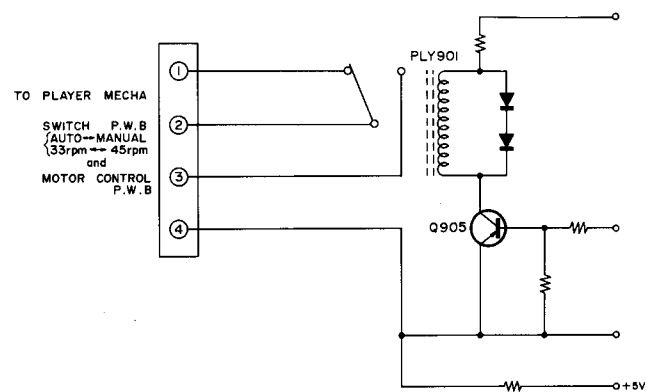
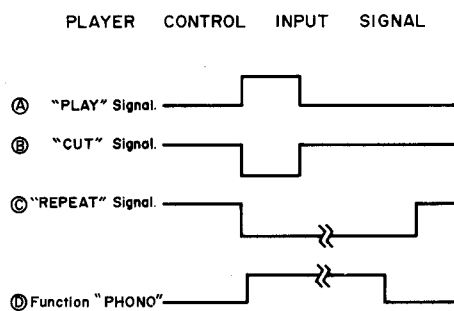


Figure 46-1

6.6 PLAYER CONTROL CIRCUIT

6.6.1 Control Pulse and Time/Mode Chart (Refer to Figures 46-2 and -3)

The signal ① shown in Fig. 46-2 serves to inhibit the manual play under other modes than phono mode.



PHONO			
INPUT MODE	PLAY	CUT	REPEAT
"OFF"	PLAY	—	REPEAT
PLAY	—	CUT	PLAY REPEAT
CUT	—	—	CUT REPEAT
REPEAT	PLAY REPEAT	—	OFF

Figure 46-2

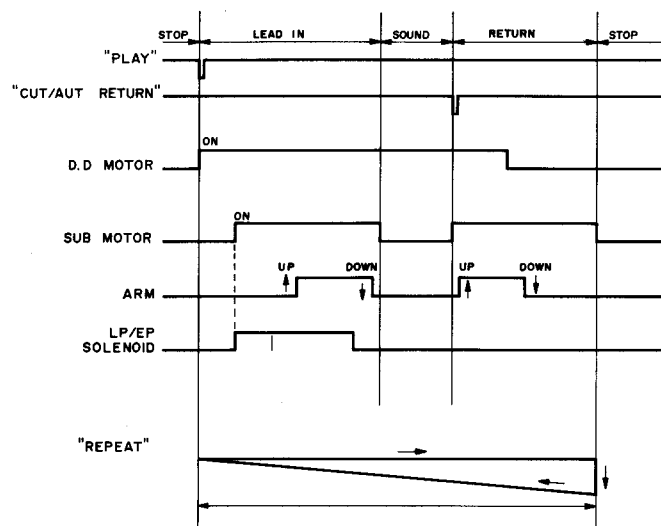


Figure 46-3

6.6.2 Play Gate Circuit (Refer to Figure 47-1)

During read-in operation or playing, this circuit functions to inhibit a generation of play signals.

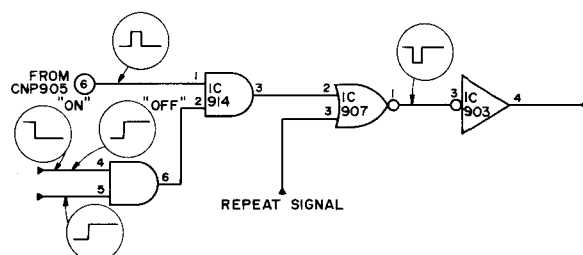


Figure 47–1

6.6.3 1.5 sec Timer (Refer to Figure 47-2)

This circuit is to provide a duration of 1.5 seconds from when there appears a play signal until the D.D. motor starts to rotate simultaneously with the record size detect circuit functioning.

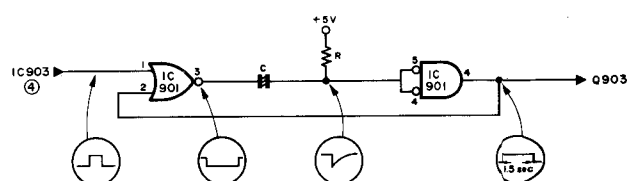


Figure 47–2

6.6.4 2 sec Timer (Refer to Figure 47-3)

With a disc to be played, the sub-motor starts to rotate and this circuit is to enable the solenoid to move for 2 seconds. The sub-motor will be stopped by the cam switch.

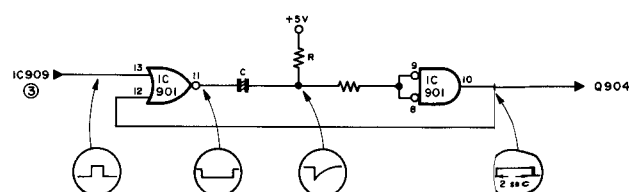


Figure 47–3

6.6.5 D.D. Motor On/Off Circuit (Refer to Figure 47–4)

In both Auto Play mode and Manual Play mode, this motor on/off circuit starts to function: a power applied via the drive circuit to the D.D. motor circuit.

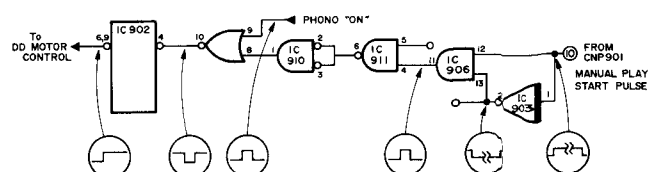


Figure 47–4

6. 6. 6 Cut-Out Memory Circuit (Refer to Figure 48-2)
While the set is in cut-out condition, this memory circuit functions to memorize this condition, which inhibits an action of the solenoid. Also, the circuit produces a signal to make the "CUT" LED indicator light up.

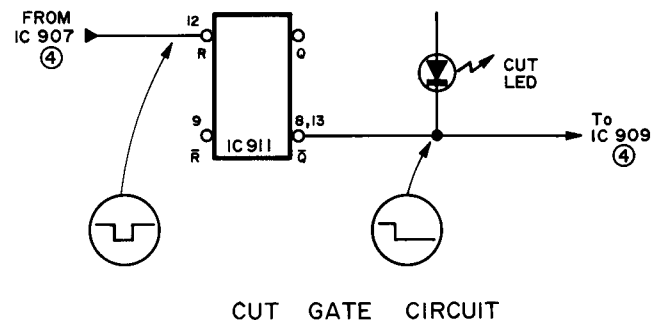


Figure 48-1

6. 6. 7 Cut Gate Circuit (Refer to Figure 48-2)
While the set is in cut-out or read-in condition, this gate circuit inhibits an entry of the cut signal. And the circuit is to transfer the auto-return signal to the cut-out memory circuit.

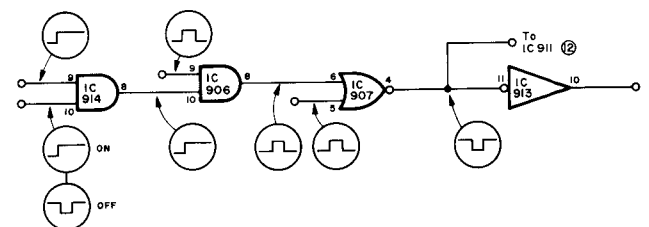


Figure 48-2

6. 6. 8 Read-In and Cut Select Circuit (Refer to Figure 48-3)
While the set is in read-in operation, this circuit enables both the sub-motor and solenoid to move. Under cut-out condition, the circuit allows only the sub-motor to move, however.

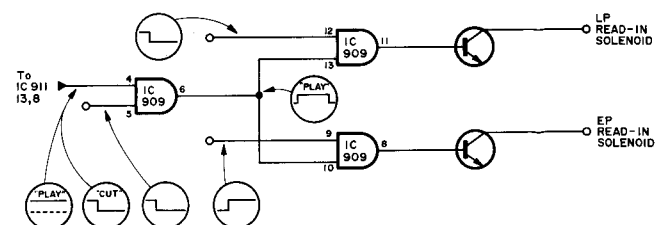


Figure 48-3

6. 6. 9 Inhibit Gate (Refer to Figure 49-1)

This gate is located before the 2 sec timer circuit and serves to inhibit the read-in operation when no disc is placed on the turntable.

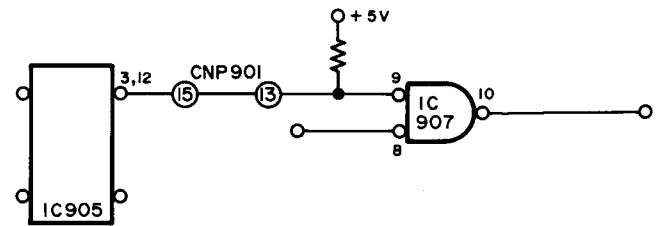


Figure 49-1

6. 6. 10 Reset Pulse and Manual Read-In Pulse Circuit (Refer to Figure 49-2)

In manual read-in operation, this circuit receives the signals from the reset switch which is electrically interlocked with the arm, so as to turn on the D.D. motor. And it, in turn, generates pulse signal to turn off the D.D. motor, when a playing is finished.

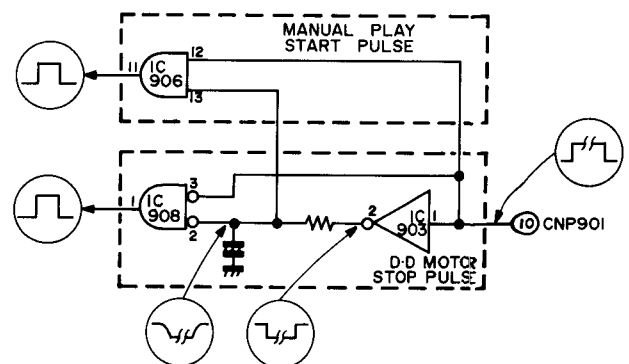
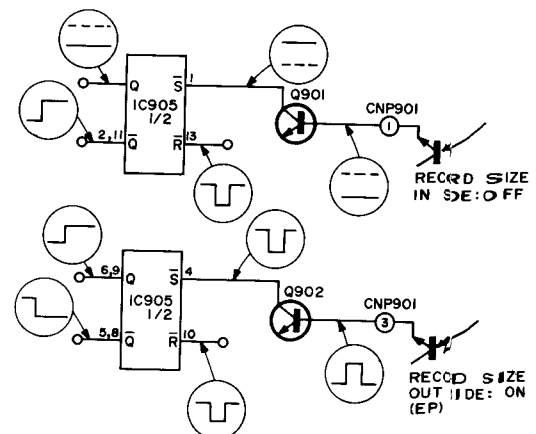


Figure 49-2

6. 6. 11 Record Size Detect Circuit (Refer to Figure 49-3)

This circuit is to detect the size (30 cm or 17 cm) of a disc in playing according to a variation of the voltage level (high or low) of the detect photo transistor.



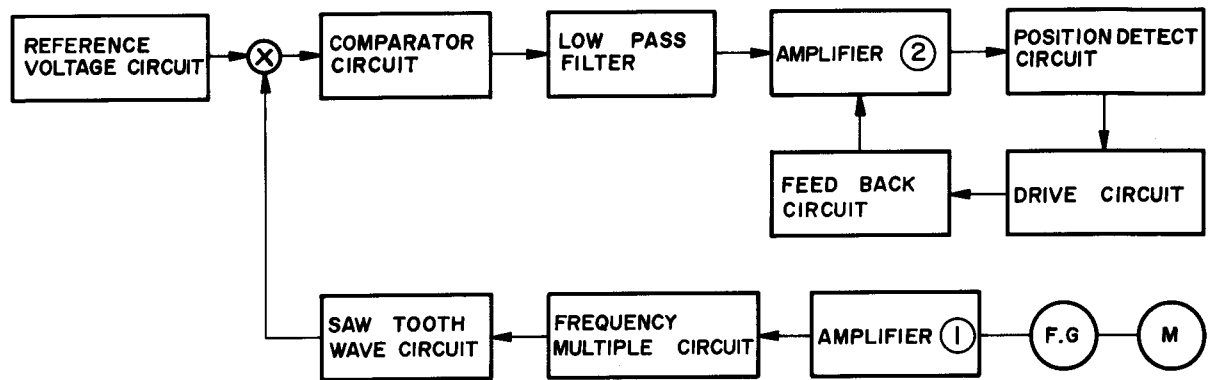


Figure 50-1

PLAYER MOTOR CONTROL UNIT

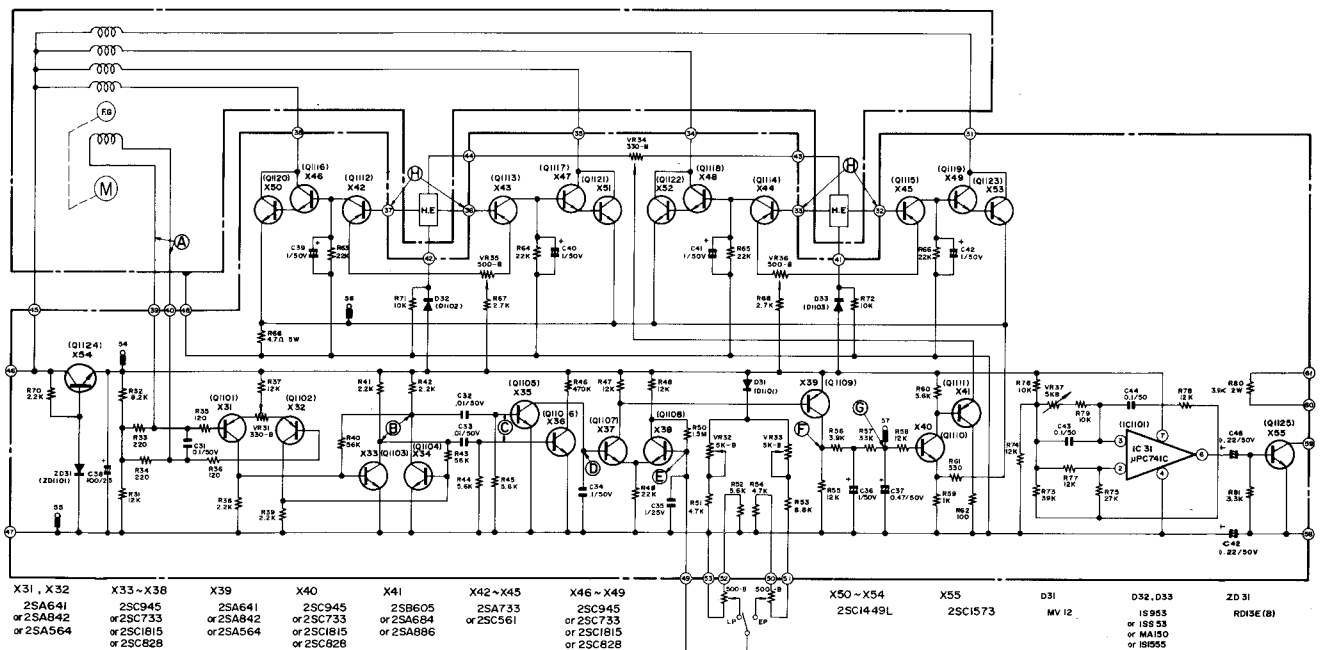


Figure 50-2

6.7 D.D. MOTOR CONTROL CIRCUIT (Refer to Figures 50-1, 50-2 and 51)

• Frequency Generator

The frequency generator consists of 72-pole magnet, multi-gap head (having 36 pairs of yokes) and coil, and works to produce sine waves of 20 Hz and 27 Hz respectively for LP and EP discs to be played.

LP : 0.62 V p-p

EP : 0.84 V p-p

• Frequency Multiple Circuit

Receiving the signals (polarity-converted one and non-polarity-converted one) from the preceding amplifier circuit, this circuit is to differentiate them into a pulse which is featured by its high rising speed and narrow width.

• Saw Tooth Wave Circuit

The saw tooth wave circuit is composed of capacitor and resistor (to form a charge circuit) and switching transistor (to discharge the voltage once charged by the capacitor) and it is to produce saw tooth waves each of which has the peak value proportional to the given frequency.

LP : 4.6 V

EP : 3.6 V

• Reference Voltage Circuit

The reference voltage circuit is to set the motor r.p.m. according to LP or EP disc to be played: coming from the regulated voltage circuit, the voltage is voltage-divided here to become a reference voltage. The variable resistor is provided so as to vary the voltage-division ratio of this circuit thus enabling a variation of the given frequency — namely, it is possible with the variable resistor to adjust the reference voltage as desired.

LP : 4.6 V

EP : 3.6 V

• Comparator Circuit

This is the differential comparator circuit with a switching transistor included.

The circuit is to compare the actual peak value of the saw tooth wave with the reference level and it is turned off or on according to whether the former value is lower than the latter or vice versa.: the result is that the frequency variation is converted into the average change of output pulses.

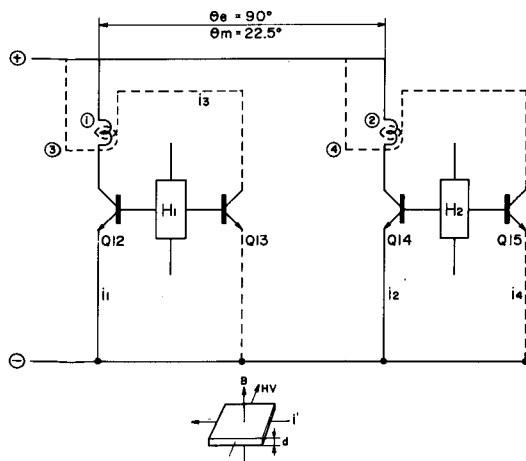


Figure 51-1

• Position Detect Circuit

The position detect circuit includes two Hall elements that are to detect the disc position (say, N-pole or S-pole of the rotor's magnet) and it is thus to apply the signal to the four-phase coil. The Hall element electromotive force is controlled by its bias variation.

• Drive Circuit

The drive circuit is to amplify the output of the Hall elements, then to be applied to the four-phase coil (Hall element electromotive force: 0.2 V p-p).

• Feedback Circuit

The feedback circuit is to initiate a negative feedback from the drive circuit to the amplifier circuit, thus assuring a more stabilized operation of the whole circuitry.

• As shown in Fig. 50-3, the Hall elements H1 and H2 are to detect the 8-pole magnet being changed in polarity enabling switching of the Q12 to Q15.

• The Hall elements generate, with this electromotive force, sine wave signal of about 0.2 V from one to another depending upon an increase and decrease of the bias.

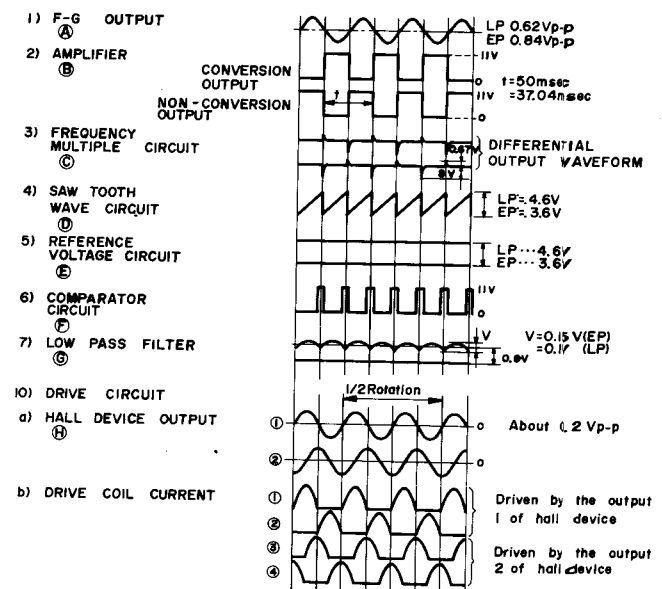


Figure 51-2

7. FUNCTION TABLE (LEVEL)

INVERTER	(INPUT) (OUTPUT) A  X A  X	<table><tr><td>A</td><td>X</td><td></td></tr><tr><td>L</td><td>H</td><td></td></tr><tr><td>H</td><td>L</td><td></td></tr></table>	A	X		L	H		H	L							
A	X																
L	H																
H	L																
BUFFER	A  X	<table><tr><td>A</td><td>X</td><td></td></tr><tr><td>L</td><td>L</td><td></td></tr><tr><td>H</td><td>H</td><td></td></tr></table>	A	X		L	L		H	H							
A	X																
L	L																
H	H																
OR·GATE	(INPUT) (OUTPUT) A  X A  X B  X B  X	<table><tr><td>A</td><td>B</td><td>X</td></tr><tr><td>L</td><td>L</td><td>L</td></tr><tr><td>L</td><td>H</td><td>H</td></tr><tr><td>H</td><td>L</td><td>H</td></tr><tr><td>H</td><td>H</td><td>H</td></tr></table>	A	B	X	L	L	L	L	H	H	H	L	H	H	H	H
A	B	X															
L	L	L															
L	H	H															
H	L	H															
H	H	H															
AND·GATE	A  X A  X B  X B  X	<table><tr><td>A</td><td>B</td><td>X</td></tr><tr><td>L</td><td>L</td><td>L</td></tr><tr><td>L</td><td>H</td><td>L</td></tr><tr><td>H</td><td>L</td><td>L</td></tr><tr><td>H</td><td>H</td><td>H</td></tr></table>	A	B	X	L	L	L	L	H	L	H	L	L	H	H	H
A	B	X															
L	L	L															
L	H	L															
H	L	L															
H	H	H															
NOR·GATE	A  X A  X B  X B  X	<table><tr><td>A</td><td>B</td><td>X</td></tr><tr><td>L</td><td>L</td><td>H</td></tr><tr><td>L</td><td>H</td><td>L</td></tr><tr><td>H</td><td>L</td><td>L</td></tr><tr><td>H</td><td>H</td><td>L</td></tr></table>	A	B	X	L	L	H	L	H	L	H	L	L	H	H	L
A	B	X															
L	L	H															
L	H	L															
H	L	L															
H	H	L															
NAND·GATE	A  X A  X B  X B  X	<table><tr><td>A</td><td>B</td><td>X</td></tr><tr><td>L</td><td>L</td><td>H</td></tr><tr><td>L</td><td>H</td><td>H</td></tr><tr><td>H</td><td>L</td><td>H</td></tr><tr><td>H</td><td>H</td><td>L</td></tr></table>	A	B	X	L	L	H	L	H	H	H	L	H	H	H	L
A	B	X															
L	L	H															
L	H	H															
H	L	H															
H	H	L															

Figure 52-1

ALIGNMENT OF THE PLAYER SECTION

■ FREQUENCY MULTIPLE ADJUSTMENT

(Refer to Figures 53-1 and 54-2)

1. Connect the oscilloscope to the pins 55 (GND) and 57 (+).
2. Adjust the semi-variable resistor (VR1101) so that good waveform indicated in Figure 53-1.

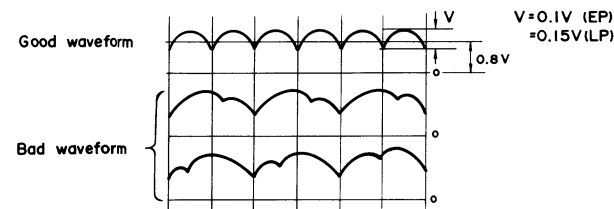


Figure 53-1

■ DRIVE CIRCUIT ADJUSTMENT

1) HALL DEVICE (Refer to Figures 53-2 and 54-2)

1. Connect the oscilloscope to the pins 55 (GND) and 56 (+).
2. Adjust the semi-variable resistor (VR1104) so that good waveform indicated in Figure 53-2.

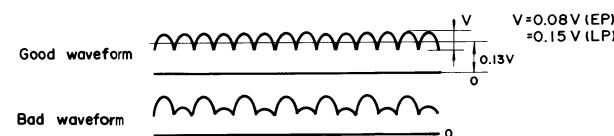


Figure 53-2

2) 4-COIL CURRENT (Refer to Figures 53-3 and 54-2)

1. Connect the oscilloscope to the pins 55 (GND) and 56 (+).
2. Adjust the semi-variable resistors (VR1105 and VR1106) so that good waveform indicated in Figure 53-3.

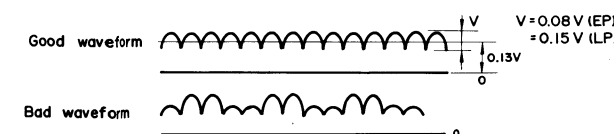


Figure 53-3

■ STROBOSCOPE FREQUENCY ADJUSTMENT

(Refer to Figure 54-2)

1. Connect the frequency counter to the base of transistor (Q1125) and ground.
2. Adjust the semi-variable resistor (VR1107) so that the frequency counter indicate 120 Hz.

■ ARM RETURN SENSOR ADJUSTMENT

1) PHOTO TRANSISTOR (Refer to Figure 54-2)

1. Set the tonearm on the tonearm rest.
2. Connect the VTVM to the pins 13 (-) and 14 (+).
3. Adjust the semi-variable resistor (VR1001) so that the VTVM reads 0.2 V.

2) SENSOR SENSITIVITY (Refer to Figure 54-2)

1. Set the tonearm on the tonearm rest and the speed selector switch to the 33 1/3 rpm position.
2. Connect the VTVM to the pins 13 (-) and 11 (+).
3. Adjust the semi-variable resistor (VR1002) so that the VTVM reads 0.8 V.

CHECK

* Speed selector switch : 45 rpm --- 0.95 V

■ AUTO RETURN ADJUSTMENT

(Refer to Figure 53-4)

Adjust the eccentric pin ① when return motion is too fast (before end of performance) and the arm doesn't return even when it has near the label on the record.

■ AUTO LEAD-IN ADJUSTMENT

(Refer to Figure 53-4)

Adjust the eccentric pin ② when the stylus descends outside the record periphery and it descends inside the starting groove of the record.

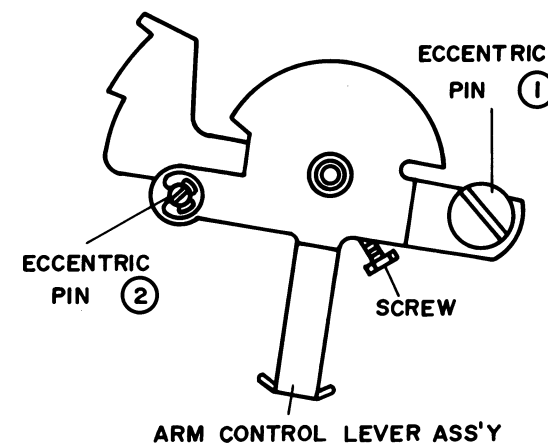


Figure 53-4

■ MOTOR'S ROTATION ADJUSTMENT

(Refer to Figures 54-1 and 54-2)

The revolutionary speed of turntable minutely varies according to the hour during a day, therefore, take the following procedures to obtain an exact speed.

1. Turn the speed fine adjustment knob clockwise or anti-clockwise to adjust so that the stripe pattern of a stroboscope provided at the platter looks like stationary.

When the stripe pattern is moving in the turning direction of platter, this shows that the rotational speed of turntable is faster than as specified.

In this case, adjust it by turning the speed fine adjustment knob toward "S".

Or, when the stripe pattern is moving against the turning direction of platter this shows that the turntable rotates slower than as specified. In such a case, adjust it by turning the speed fine adjustment knob toward "F".

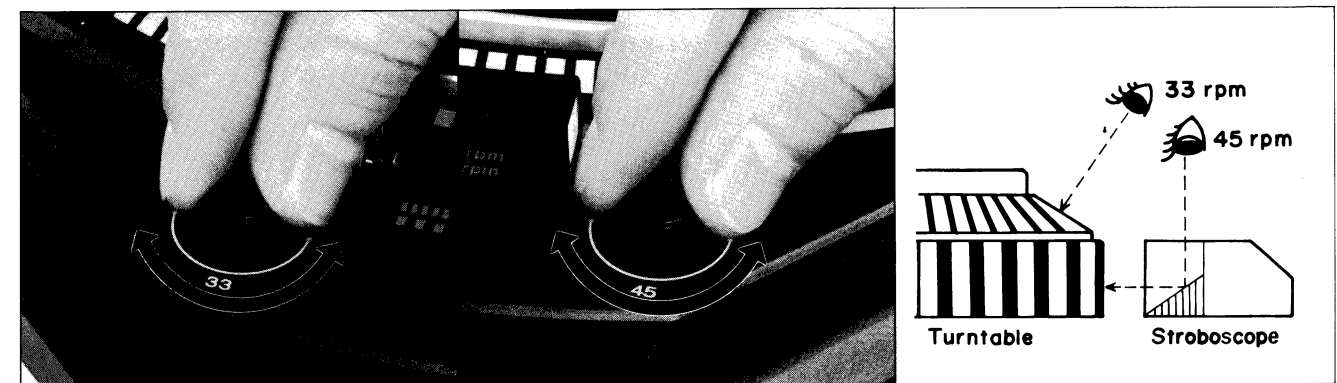
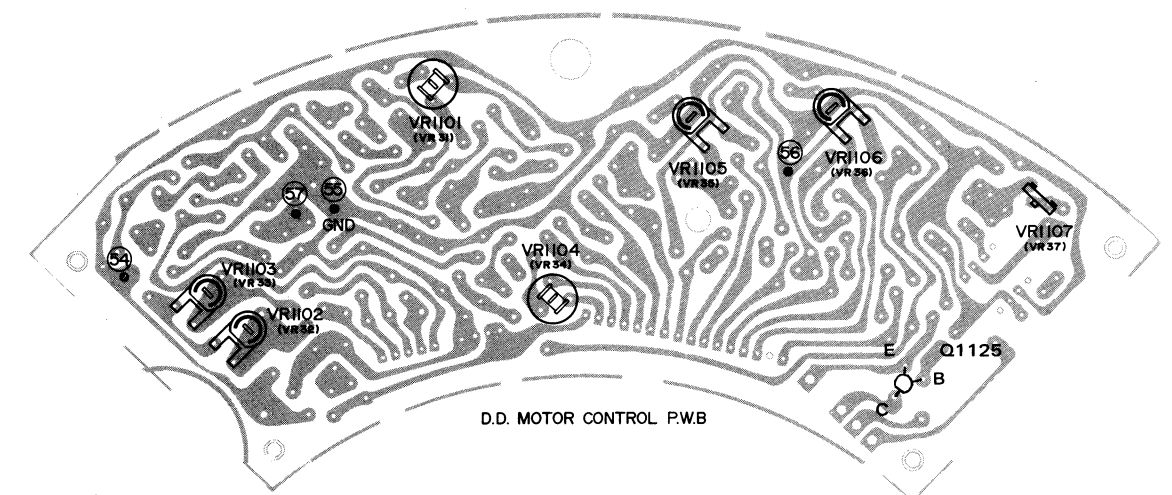


Figure 54-1



ALIGNMENT POINT

- VR1001 : Arm Return Sensor Adjust
- VR1002 : Sensor Sensitivity Adjust
- VR1101 : Frequency Multiple Adjust
- VR1102 : 33-1/3 rpm Adjust
- VR1103 : 45 rpm Adjust
- VR1104 : Hall Device Adjust
- VR1105, VR1106 : 4-Current Adjust
- VR1107 : Stroboscope Frequency Adjust

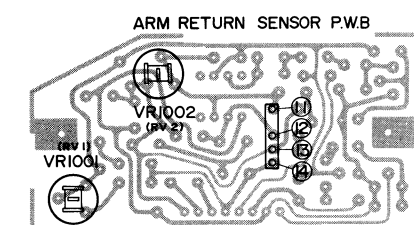


Figure 54-2 ALIGNMENT POINTS (PLAYER SECTION)

ALIGNMENT OF THE TAPE DECK SECTION

MECHANICAL ADJUSTMENT

■ TAKE-UP IDLER PRESSURE ADJUSTMENT

(Refer to Figure 55-1)

1. Set the unit in play mode.
2. Pull the point A with use of tension gauge (0 to 100 gr.) to make the take-up idler apart from the take-up turntable. Then, gradually release the tension gauge and read its value when the take-up turntable starts to rotate.
3. It is normal when the tension gauge reads 65 – 95 gr. If the above value is not satisfied, adjust the take-up idler pressure spring by bending it or replace.

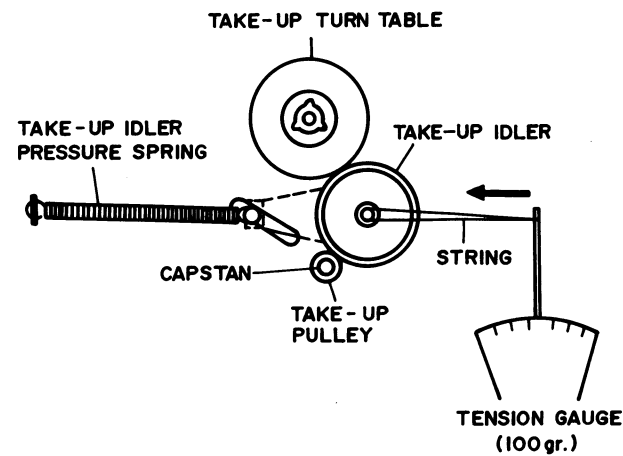


Figure 55-1

■ PRESSURE ROLLER PRESSURE ADJUSTMENT

(Refer to Figure 55-2)

1. Set the unit in play mode.
2. Push the point A with use of tension gauge (0 to 500 gr.) to make the pressure roller apart from the capstan shaft. Then, check that the tension gauge will reads 250 – 350 gr. when the pressure roller stops to rotate.
3. As a result of the check in the step 2 above, if the reading is found outside the range of 250 – 350 gr., adjust the pressure spring of pressure roller by bending it or replace.

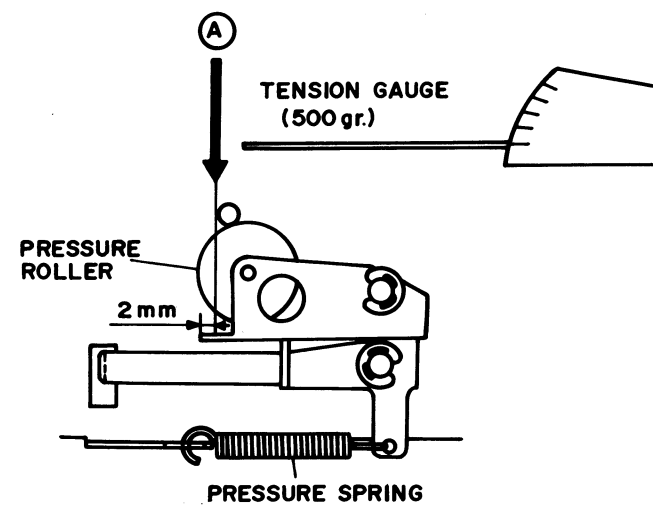


Figure 55-2

■ FLYWHEEL THRUST CLEARANCE ADJUSTMENT (Refer to Figure 55-3)

Slowly tighten the screw for flywheel thrust clearance until the thrust clearance becomes 0 (zero) and loosen the screw by 1/5 ~ 3/5 turn from this point. Since screw's pitch is 0.5 mm, thrust clearance of about 0.1 ~ 0.3 mm is produced.

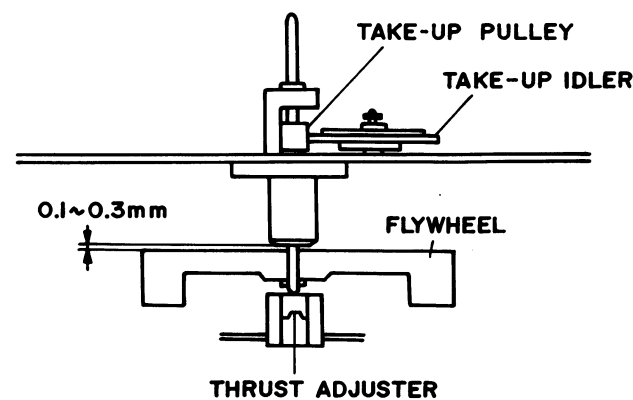


Figure 55-3

■ TORQUE CHECK

(Refer to Figure 56-1)

1. Set the torque measuring reel to the turntable (to the take-up side at playback or fast forward mode and to the supply side at rewind mode).
2. Then, rotate the reel in the same direction as for turntable and read the torque value when the pointer is stabilized.

Mode	Torque Value
Playback	30 – 60 gr. cm
Fast Forward	80 – 120 gr. cm
Rewind	80 – 120 gr. cm

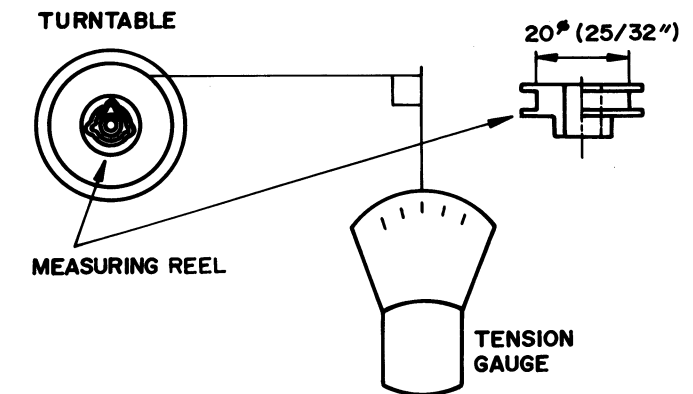


Figure 56-1

■ TAPE SPEED ADJUSTMENT

(Refer to Figure 56-2)

1. Connect an 4 ohm dummy resistor to the speakers socket (SO2 or SO3).
2. Connect a frequency counter across the 4 ohm resistor.
3. Use a test tape (MTT-111, 3 kHz) to be played back (at the midpoint but not at the running start or end point.)
4. Use a bladed screwdriver to adjust, through the adjusting hole at the bottom of motor, the semi-variable resistor so that the reproduced frequency becomes 2985 to 3015 Hz.

Note:

Before the adjustment, check that there is no stain nor other impurities on the motor pulley, drive belt, flywheel, take-up pulley, take-up idler and take-up turntable.

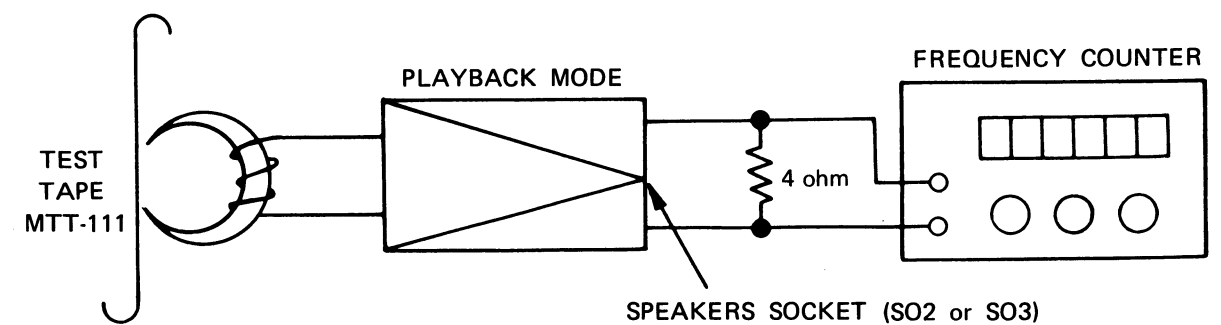
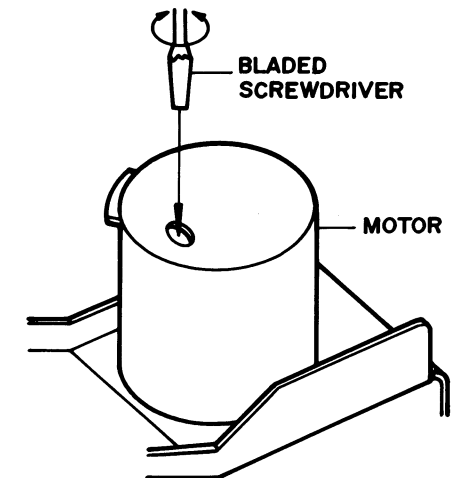


Figure 56-2

ELECTRICAL MEASUREMENT

* Set the FUNCTION switch to the TAPE position.

RECORD/PLAYBACK HEAD AZIMUTH ADJUSTMENT

(Refer to Figures 57-1 and 61-1)

1. Connect load resistor (4 ohm) to the speaker socket (SO2, SO3) and further connect the VTVM thereto.
2. Insert the test tape (MTT-114:10 kHz, -10 dB Recorded).
3. Set the Dolby N.R. switch (SW506) to the OFF position.
4. Set the BIAS switch (SW504) and EQ switch (SW503) to the NORMAL position.
5. Set the unit in PLAYBACK mode.
6. Adjust the head azimuth adjusting screw so that the playback output voltage becomes maximum in both channels.

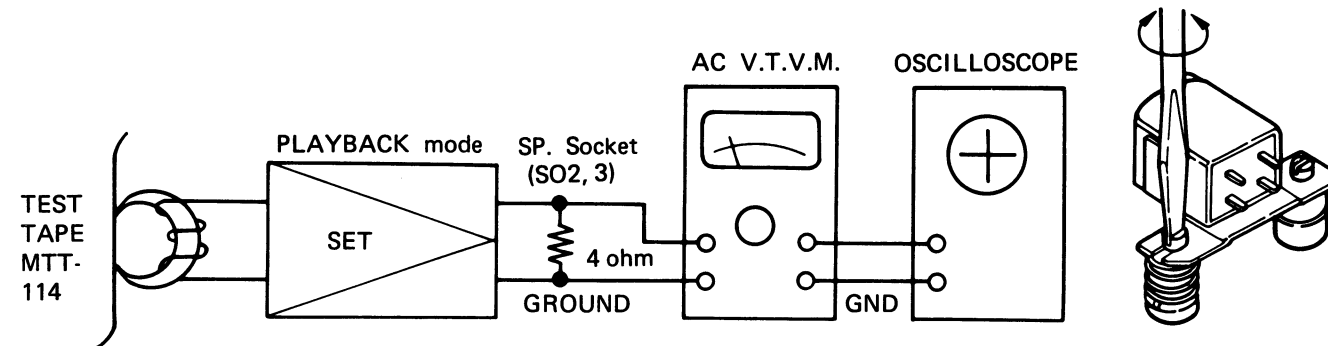


Figure 57-1

PLAYBACK SENSITIVITY ADJUSTMENT

(Refer to Figures 57-2 and 61-1)

1. Connect the VTVM to the test point TP501 (TP503) and test point TP502 (ground).
2. Insert the test tape (MTT-150, 400 Hz Recorded).
3. Set the Dolby N.R. switch (SW506) to the OFF position.
4. Set the BIAS switch (SW504) and EQ switch (SW503) to the NORMAL position.
5. Set the unit in PLAYBACK mode.
6. Adjust the semi-variable resistor (VR501, VR502) so that the VTVM reads 580 mV.

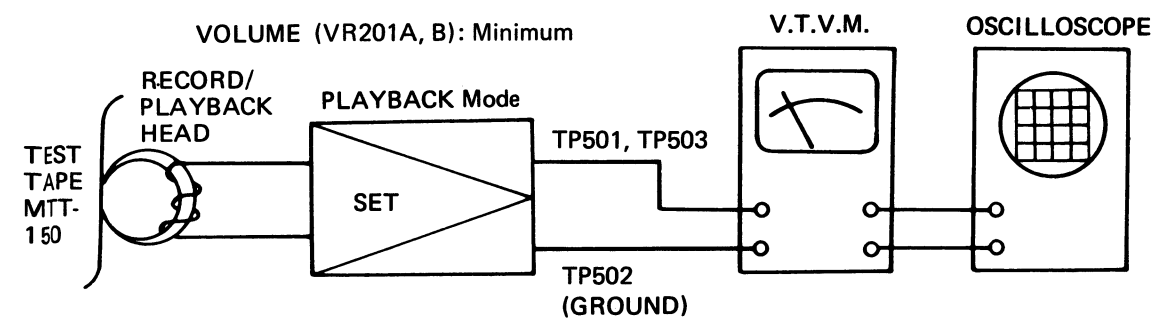


Figure 57-2

LEVEL METER SENSITIVITY ADJUSTMENT

(Refer to Figures 58-1 and 61-1)

1. Connect the VTVM to the test point TP501 (TP503) and test point TP502 (ground).
2. Insert the tape (non-recorded)
3. Set the function switch to the AUX/MIC position and the Dolby N.R. switch (SW506) to the OFF position.
4. Set the BIAS switch (SW504) and EQ switch (SW503) to the NORMAL position.
5. Connect the C.R. oscillator to the REC/PB socket (SO103) and apply signals (1 kHz, -16 dB) to the unit.
6. Set the unit in RECORD mode, and adjust the REC LEVEL control (VR503, VR504) so that the VTVM reads 580 mV.
7. Adjust the semi-variable resistor (VR505, VR506) so that the level meter indicates "0 VU".

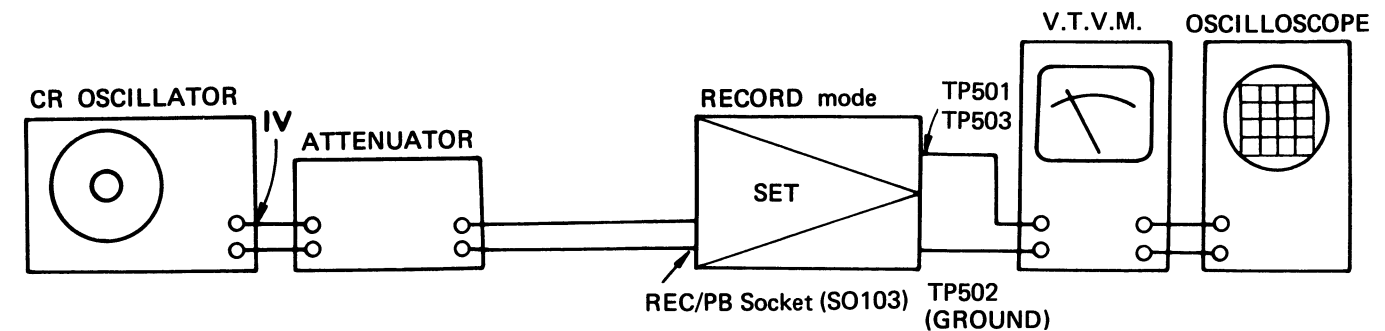


Figure 58-1

RECORD AMPLIFIER BIAS CURRENT ADJUSTMENT

(Refer to Figures 58-2 and 61-1)

1. Connect the VTVM across the 100 ohm resistor (R659, 660).
2. Insert the tape (non-recorded)
3. Set the BIAS switch (SW504) and EQ switch (SW503) to the NORMAL position.
4. Set the unit in RECORD mode.
5. Adjust the semi-variable resistor (VR513, 514) so that the VTVM readings becomes 41 mV.

CHECK;

- * BIAS switch (SW504)
- EQ switch (SW503)
- : CrO₂ position
- 49 - 59 mV
- : Fe-Cr position
- 38 - 44 mV

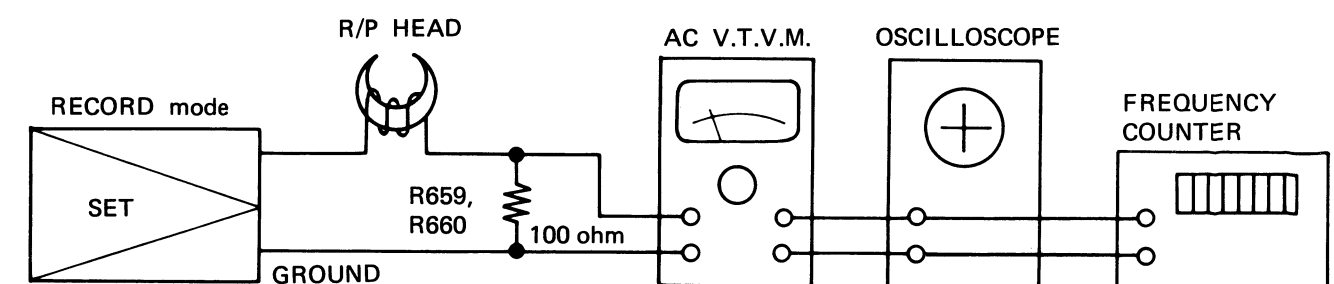


Figure 58-2

■ ERASE CURRENT CHECK

(Refer to Figures 59-1 and 61-1)

1. Connect the VTVM across the 1 ohm resistor (R661)
2. Insert the tape (non-recorded).
3. Set the BIAS switch (SW504) and EQ switch (SW503) to the NORMAL position.
4. Set the unit in RECORD mode.
5. Make sure the erase current is 60 ~ 120 mV.
 * BIAS switch (SW504) } CrO₂ position
 EQ switch (SW503) }
 → 90 ~ 150 mV
6. Make sure the record oscillator bias frequency is 84 ± 5 kHz.

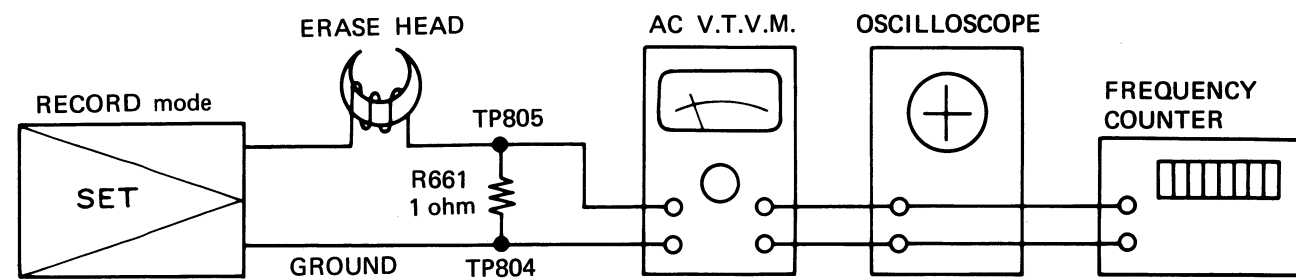


Figure 59-1

■ RECORD AND PLAYBACK SENSITIVITY ADJUSTMENT

(Refer to Figures 59-2 and 61-1)

1. Insert the tape (non-recorded), and set the function switch to the AUX/MIC position.
2. Connect the C.R. oscillator to the REC/PB socket (SO103) and apply signals (1 kHz, -16 dB) to the unit.
3. Set the unit in RECORD mode, and adjust the REC LEVEL control (VR503, VR504) so that the LEVEL meter indicates "0 VU".
4. Reproduce the tape which has been recorded at the step 2 above.
5. Adjust the * semi-variable resistor (VR507 ~ VR512) so that the LEVEL meter indicates "0 VU". (within ± 0.5 VU)

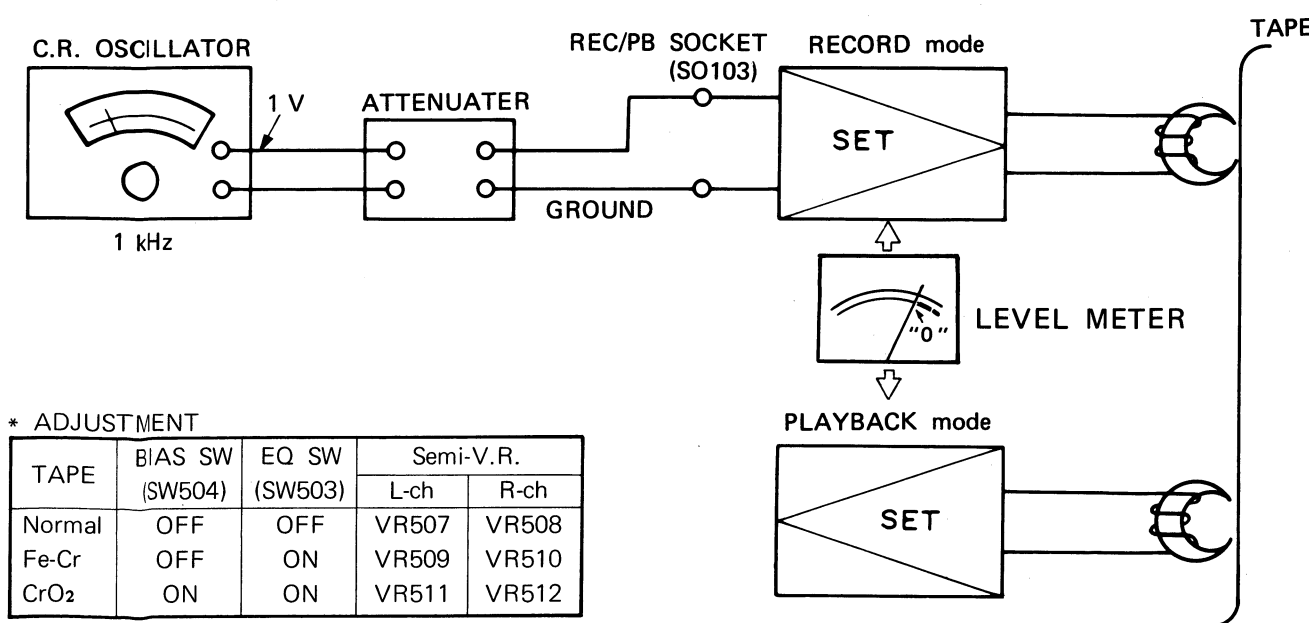


Figure 59-2

■ DOLBY NOISE REDUCTION CHECK

(Refer to Figures 60-1 and 61-1)

1. Connect the VTVM to the test point TP501 (TP503) and test point TP502 (GROUND).
2. Insert the tape (non-recorded)
3. Set the function switch to the AUX/MIC position and the Dolby N.R. switch (SW506) to the OFF position.
4. Set the BIAS switch (SW504) and EQ switch (SW503) to the NORMAL position.
5. Connect the C.R. oscillator to the REC/PB socket (SO103) and apply signals (100 Hz, -35 dB) to the unit.
6. Set the unit in RECORD mode, and adjust the REC LEVEL control (VR503, VR504) so that the VTVM reads 32.6 mV.
7. Set the Dolby N.R. switch (SW506) to the ON position and apply signals (1 kHz) to the unit. If the indication of the VTVM is 43 ~ 85 mV at that time, this means that the Dolby Noise Reduction is normal.

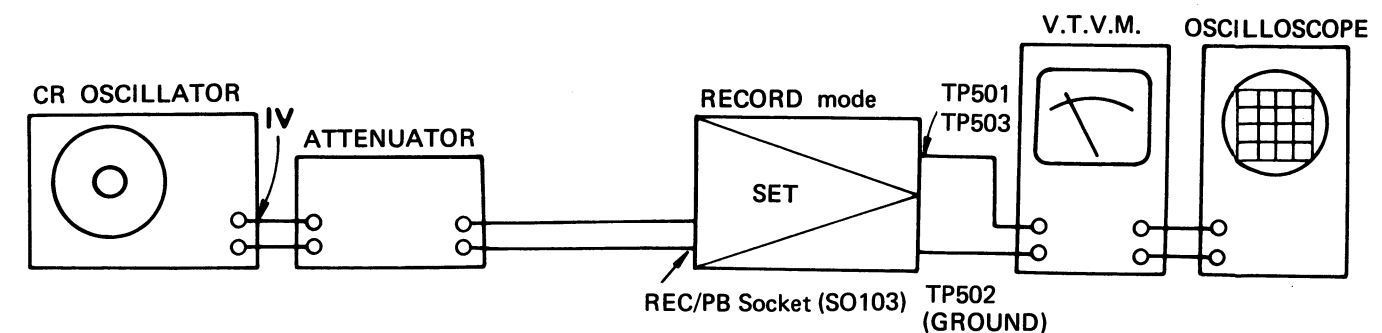


Figure 60-1

NOTE: For the measurement of playback frequency response, use the standard test tape below:

EQ switch	TYPE NUMBER
NORMAL	MTT-117E, MTT-217G, MTT-217E, MTT-216
CrO ₂ , Fe-Cr	MTT-117SP, MTT-316

• AM IF ALIGNMENT POINT

T103 :AM I.F.T. (H;455 kHz, E;465 kHz)
T104 :AM IF trap filter

• AM RF ALIGNMENT POINT

SW
L106 :SW antenna coil
L111 :SW oscillation coil
TC101 :SW antenna trimmer
TC104 :SW oscillation trimmer
MW
L108 :MW antenna coil
L112 :MW oscillation coil
TC102 :MW antenna trimmer
TC105 :MW oscillation trimmer
LW
L109 :LW antenna coil
L113 :LW oscillation coil
TC103 :LW antenna trimmer
TC106 :LW oscillation trimmer

• FM IF ALIGNMENT

IFT :I.F.T. (Front end)
T101 :FM quadrature
T102 :FM quadrature

• FM RF ALIGNMENT

LA :FM antenna coil
LR :FM RF coil
LO :FM oscillation coil
TCA :FM antenna trimmer
TCR :FM RF trimmer
TCO :FM oscillation trimmer
VR103 :FM low frequency adjust
VR106 :FM high frequency adjust

(Front end)

• FM MPX ALIGNMENT

VR101 :FM V.C.O. adjust
VR102 :FM stereo separation adjust

• FM PRE-SET METER ADJUSTMENT

VR104, VR105 :FM pre-set meter adjust
VR108 :U1
VR109 :U2
VR110 :U3
VR111 :U4
VR112 :U5
VR113 :U6
VR114 :U7

FM pre-set tuning

• FM MUTING ADJUSTMENT

VR801 :FM pre-set muting adjust

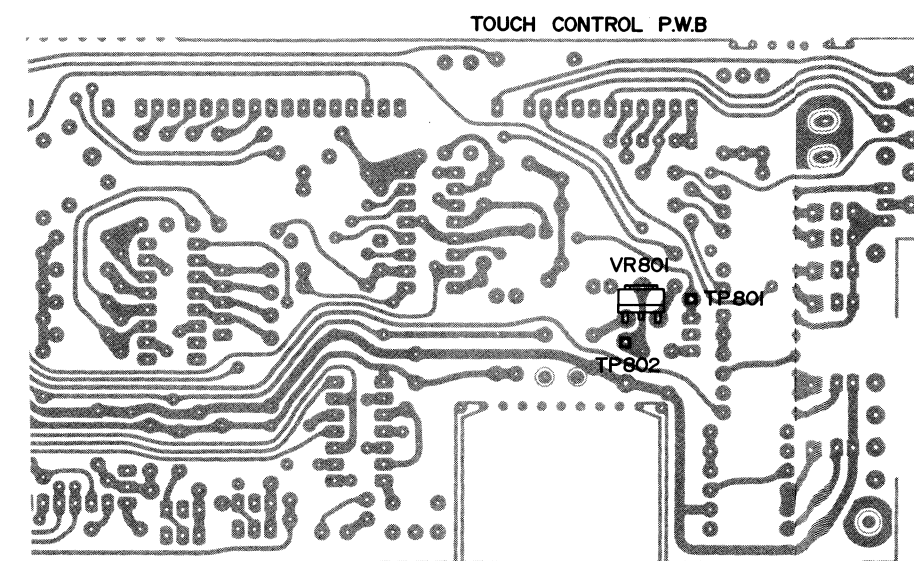
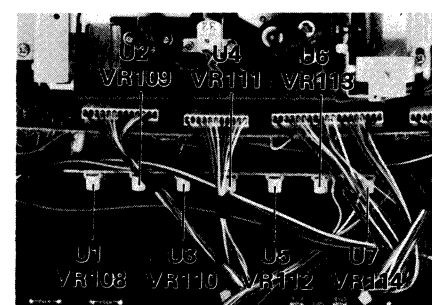
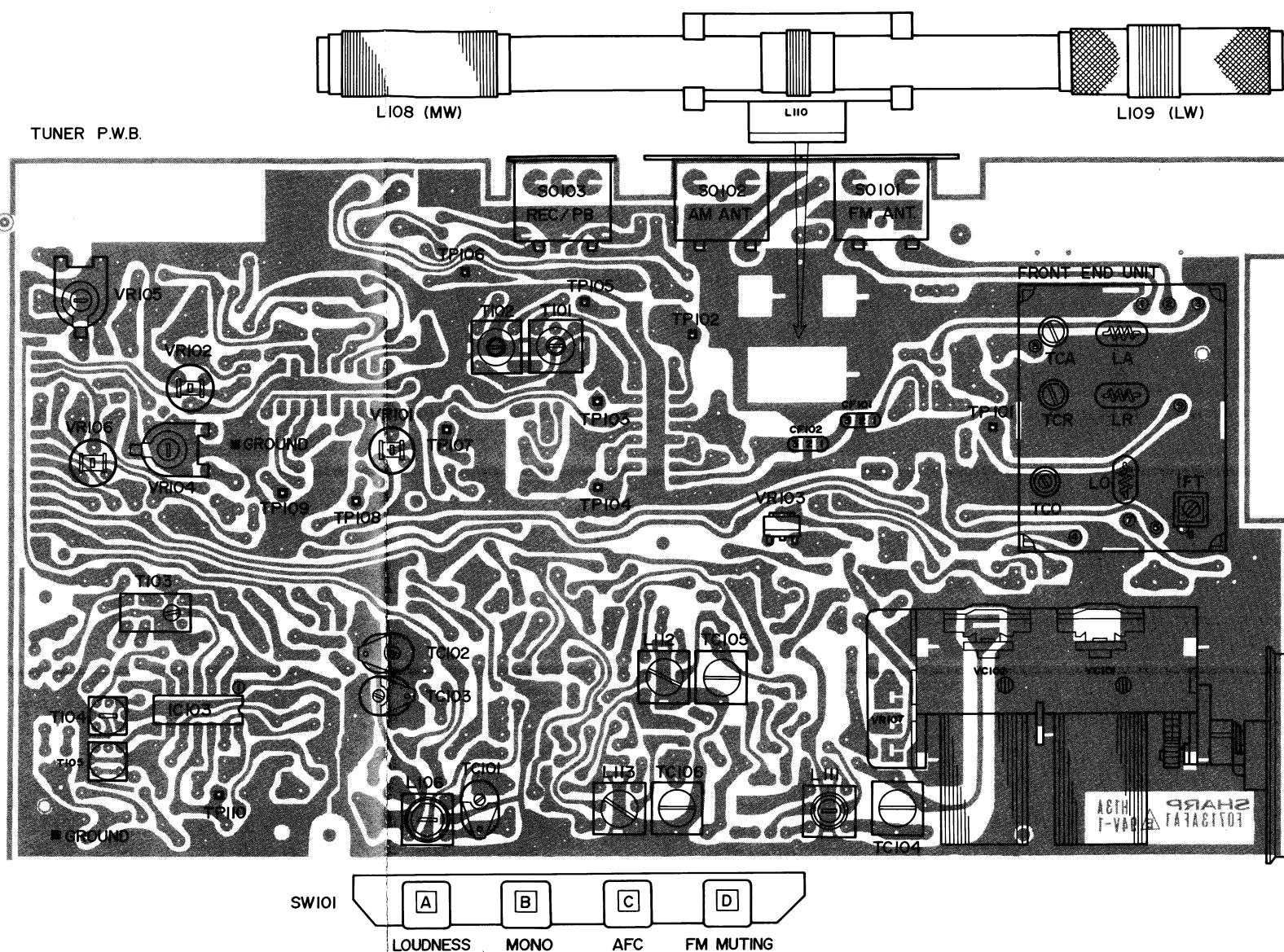


Figure 63-1 ALIGNMENT POINTS (TUNER SECTION)

ALIGNMENT OF THE TUNER SECTION

Alignment is an exacting procedure and should be undertaken only when necessary. If alignment of AM and FM is required, either section may be done first.

Note : Use a non-metallic alignment tool.

REQUIRED EQUIPMENT:

- 1. Signal generator with a frequency range of 140 kHz to 18.5 MHz: AM
- 2. Signal generator with a frequency range of 87.4 MHz to 109 MHz: FM
- 3. Signal generator with a frequency output of 10.7 MHz ± 0.5 MHz: FM
- 4. Vacuum tube voltmeter (AC-VTVM)
- 5. Sweep signal generator with a sweep range of at least 500 kHz and center frequency of 10.7 MHz with at least a 10.7 MHz marker. (Ext. Marker may be used.)
- 6. Oscilloscope with a wide range amplifier of approximately 100 kHz.
- 7. Test loops, a coil of any size wire, one turn or more.
- 8. FM stereo signal generator.
- 9. Audio signal generator with a frequency of 20 Hz to 100 kHz.
- 10. Frequency counter.

The FM stereo section, however, should be done only if the FM monaural section is properly adjusted.

Notes: Allow the set at least five minutes to warm up before attempting alignment. During alignment keep the signal generator output at the lowest level that will maintain a usable output from the set, except for FM stereo signal generator. Take much care, lest the grounding of FM sweep signal generator input should make multipaths which made FM IF alignment incorrect. To avoid this the grounding lead may be connected through 0.01 – 0.04 MFD capacitor to the tuner chassis when sweep generator is connected to the tuner section.
Generator modulation (AM) . . . 30%, 400 Hz
Generator modulation (FM) . . . 40 kHz, 400 Hz
Generator modulation CH.L. or CH.R. (FM stereo) 40 kHz, 1000 Hz Mod.

THE INSTRUCTION OF FREQUENCY ADJUSTMENT

In order to comply with FTZ rule Nr. 358/1970, please fix the low end of dial frequency (87.5 MHz) and the high end of dial frequency (108 MHz) on FM band, by adjusting fL

variable resistor (VR103) and fH variable resistor (VR106) respectively, as illustrated in Figure

ALIGNMENT CHART

AM IF ALIGNMENT (Refer to Figures 63–1 and 65–1)

STEP	BAND	TEST STAGE	SIGNAL GENERATOR		DIAL POINTER SETTING	SCOPE CONNECTION	ADJUSTMENT	REMARKS
			CONNECTION	FREQUENCY				
1	MW	IF	Through 0.01µF to IC103 (1 Pin) as small as possible	455kHz (Sweep)	High end of Dial	Oscilloscope connected to TP110 and ground.	Adjust T103 to obtain maximum response, at 455 kHz. Next, adjust T104 to obtain minimum response at 455kHz	Repeat 2 or 3 times.

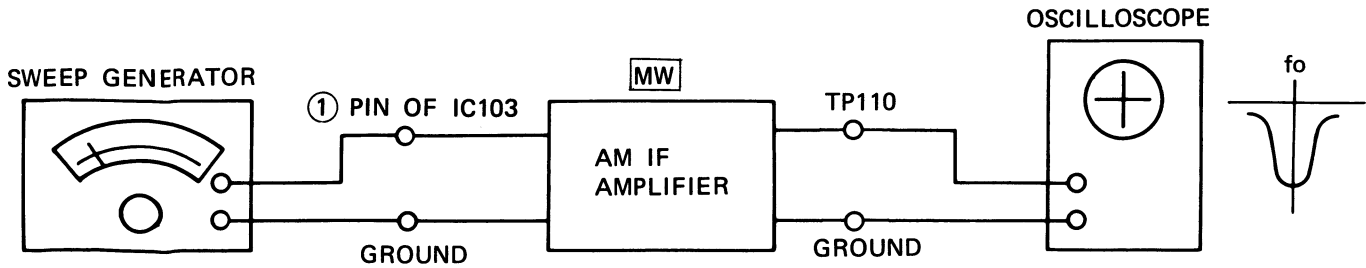


Figure 65–1 AM IF ALIGNMENT EQUIPMENT CONNECTIONS

AM RF ALIGNMENT (Refer to Figures 63–1 and 66–1)

STEP	BAND	TEST STAGE	SIGNAL GENERATOR		DIAL POINTER SETTING	METER CONNECTION	ADJUSTMENT	REMARKS
			CONNECTION	FREQUENCY				
1	SW	Band Coverage	Through IEC dummy to AM EXT ANT. as small as possible	5.7MHz Modulated	Low end of Dial	Same as above	Oscillation coil L111	Adjust for maximum output Repeat 2 or 3 times.
2	SW		Same as above	18.3MHz Modulated	High end of Dial	Same as above	Oscillation Trimmer TC104	
3	SW	Tracking	Same as above	6.5MHz Modulated	6.5MHz	Same as above	Antenna coil L106	
4	SW		Same as above	16MHz Modulated	16MHz	Same as above	Antenna Trimmer TC101	
5	MW	Band Coverage	Radiated Signal as small as possible	515kHz Modulated	Low end of Dial	Same as above	Oscillation coil L112	
6	MW		Radiated Signal as small as possible	1650kHz Modulated	High end of Dial	Same as above	Oscillation Trimmer TC105	
7	MW	Tracking	Radiated Signal as small as possible	600kHz Modulated	600kHz	Same as above	Antenna coil L108	
8	MW		Radiated Signal as small as possible	1400kHz Modulated	1400kHz	Same as above	Antenna Trimmer TC102	
9	LW	Band Coverage	Radiated Signal as small as possible	145kHz Modulated	Low end of Dial	VTVM connected to TP109 and ground	Oscillation coil L113	
10	LW		Radiated Signal as small as possible	385kHz Modulated	High end of Dial	Same as above	Oscillation Trimmer TC106	
11	LW	Tracking	Radiated Signal as small as possible	170kHz Modulated	170kHz	Same as above	Antenna coil L109	
12	LW		Radiated Signal as small as possible	340kHz Modulated	340kHz	Same as above	Antenna Trimmer TC103	

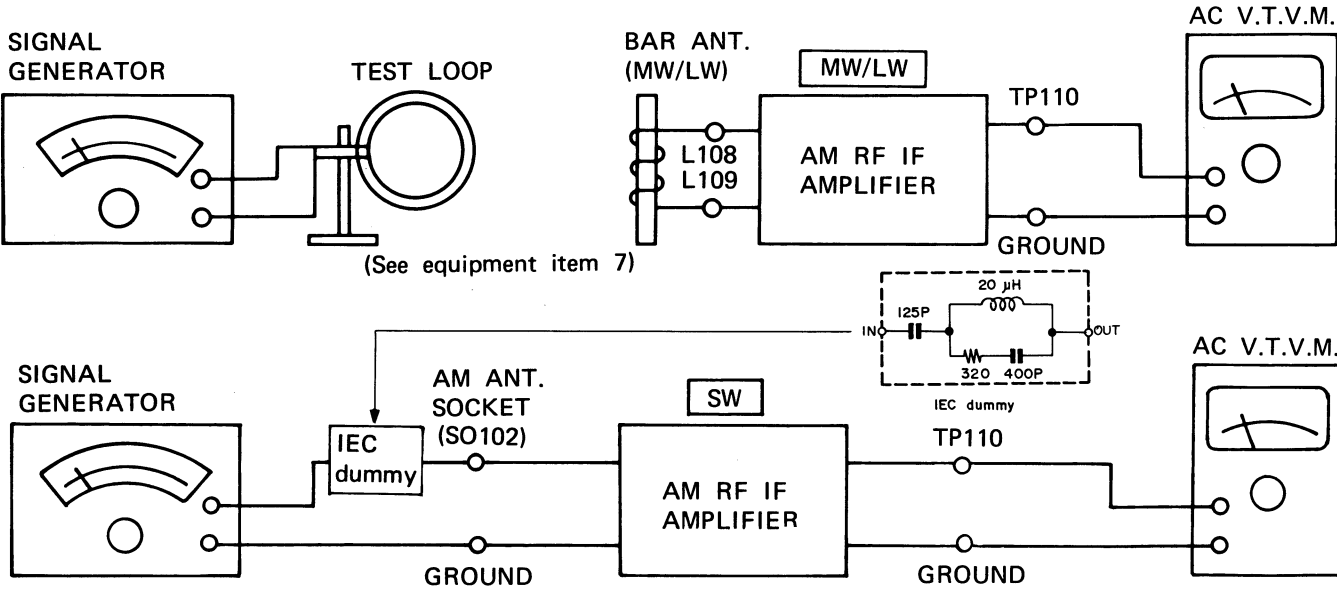


Figure 66–1 AM RF ALIGNMENT EQUIPMENT CONNECTIONS

FM IF ALIGNMENT (Refer to Figures 63-1 and 67-1)

AFC/MUTING switch (SW101C, D) : OFF

STEP	BAND	TEST STAGE	SIGNAL GENERATOR		DIAL POINTER SETTING	METER SCOPE CONNECTION	ADJUSTMENT	REMARKS
			CONNECTION	FREQUENCY				
1	FM	IF (See NOTE A)	Through 1.5pF to TP101 and ground.	10.7MHz $\pm$ 500kHz as small as possible	High end of Dial	Oscilloscope connected to test point TP104 and ground.	IFT FM TUNER Front end	Adjust "IF" curve at maximum as shown in the figure 67-1
2	FM		Same as above	No signal	Same as above	VTVM connected to test point TP102 (+) and TP105 (-)	T101	Adjust the 0V to lead of VTVM
3	FM		Same as above	Same as step 1	Same as above	Oscilloscope connected to test point TP106	T102	Adjust for best "S" curve

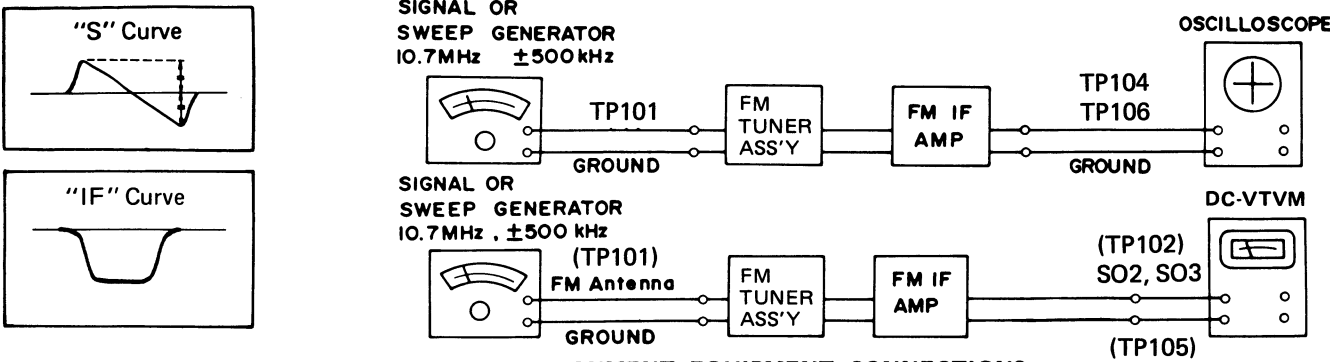


Figure 67-1 FM ALIGNMENT EQUIPMENT CONNECTIONS

FM RF ALIGNMENT (Refer to Figures 63-1 and 67-1)

AFC/MUTING switch (SW101C, D) : OFF
Pre-set Control button : MANUAL

STEP	BAND	TEST STAGE	SIGNAL GENERATOR		DIAL POINTER SETTING	METER CONNECTION	ADJUSTMENT	REMARKS
			CONNECTION	FREQUENCY				
1	FM	Band coverage	FM Antenna	87MHz as small as possible (Modulated)	Low end of Dial	DC-VTVM connected to 8 pin of FM FRONT END	VR103	Adjust the 2.87V to 8 pin of FM Tuner Front end
2			Same as above	109MHz as small as possible (Modulated)	High end of Dial	Same as above	VR106	Adjust the 24.24V to 8 pin of FM Tuner Front end. Repeat steps 1 and 2 until no further improvement can be made
* 3			Same as above	87MHz as small as possible (Modulated)	Low end of Dial	VTVM Connection to SO2 or SO3	Oscillation coil LO	Adjust for maximum output
* 4			Same as above	109MHz as small as possible (Modulated)	High end of Dial	Same as above	Oscillation trimmer TCO	Same as above. Repeat steps 3 and 4 until no further improvement can be made
* 5	FM	Tracking	Same as above	90MHz as small as possible (Modulated)	90MHz	Same as above	Antenna coil LA and RF coil LR	Adjust for maximum output
* 6			Same as above	106MHz as small as possible (Modulated)	106MHz	Same as above	Antenna trimmer TCA and RF trimmer TCR	Same as above 5~6 Repeat 2 or 3 Times

(*) As for FM high-frequency range (front-end section), since it has been already adjusted, do not rotate the coils and trimmers unless the adjustment becomes necessary — readjust the FM-high frequency only when it suffers a considerable disalignment.

FM MPX ALIGNMENT (Refer to Figures 63-1 and 68-1)

STEP	BAND	TEST STAGE	STEREO SIGNAL GENERATOR		TUNING FREQUENCY	METER CONNECTION	ADJUSTMENT	REMARKS
			CONNECTION	MOD FREQUENCY				
1	FM	V.C.O.	FM-ANT. Terminal	98MHz Modulated	98MHz	VTVM connected to TP109 and ground	VR101	Adjust for 19 $\pm$ 0.1 kHz
2	FM	STEREO SEPARATION	FM-ANT. Terminal	98MHz stereo Mod. (1000Hz) L-ch only	98MHz	VTVM connected to L-ch SP. socket	Volume control (VR201A, B)	Adjust the VTVM reads 1.4V (0dB)
3			Same as above	Same as above	Same as above	VTVM connected to R-ch SP. socket	VR102	Adjust for minimum output

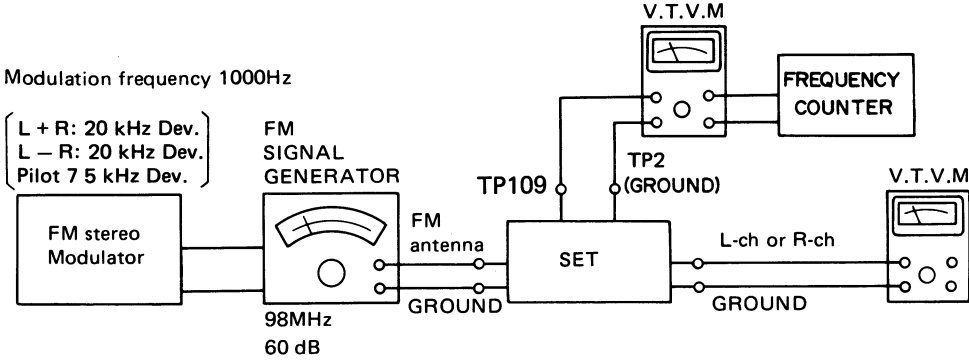


Figure 68-1 FM STEREO ALIGNMENT EQUIPMENT CONNECTIONS

■ FM PRESET METER ADJUSTMENT

- (Refer to Figures 63-1 and 68-2)
- Set the function switch (SW1) to "U-FM" position.
 - Connect the FM signal generator to the FM antenna terminal of the unit. (The FM signal generator is kept to "88 MHz".)
 - Rotate the U1 preset knob of the unit to tune in 88 MHz signal.
 - Adjust the semi-variable resistor VR105 so that the FM preset meter ME102 will indicate "88 MHz".
 - Have the FM signal generator produce 104 MHz signal.
 - Rotate the U2 preset knob of the unit to tune in 104 MHz signal.
 - Adjust the semi-variable resistor VR104 so that the FM preset meter ME102 will indicate "104 MHz".
 - Repeat two or three times the procedures 2 to 7 stated above.

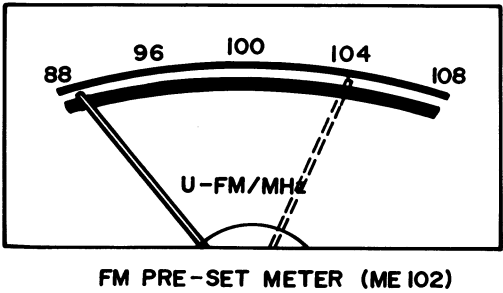
■ FM MUTING ADJUSTMENT

- (Refer to Figure 63-1)
- Connect the DC VTVM to TP802 and ground.
 - Adjust the semi-variable resistor (VR801) so that the DC VTVM reads 3.8 V.

NOTE A

Five kinds of ceramic filter (CF101, CF102) are available for this set. The difference of central frequency from each other can be known by the color indication. The table below shows such a difference of IF and S curve, depending upon the color indications of the ceramic filter (CF101, CF102).

Central Frequency	D	Black	10.64MHz $\pm$ 30kHz
	B	Blue	10.67MHz $\pm$ 30kHz
	A	Red	10.70MHz $\pm$ 30kHz
	C	Orange	10.73MHz $\pm$ 30kHz
	E	White	10.76MHz $\pm$ 30kHz



FM PRE-SET METER (ME 102)

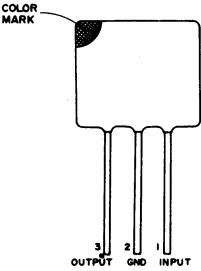
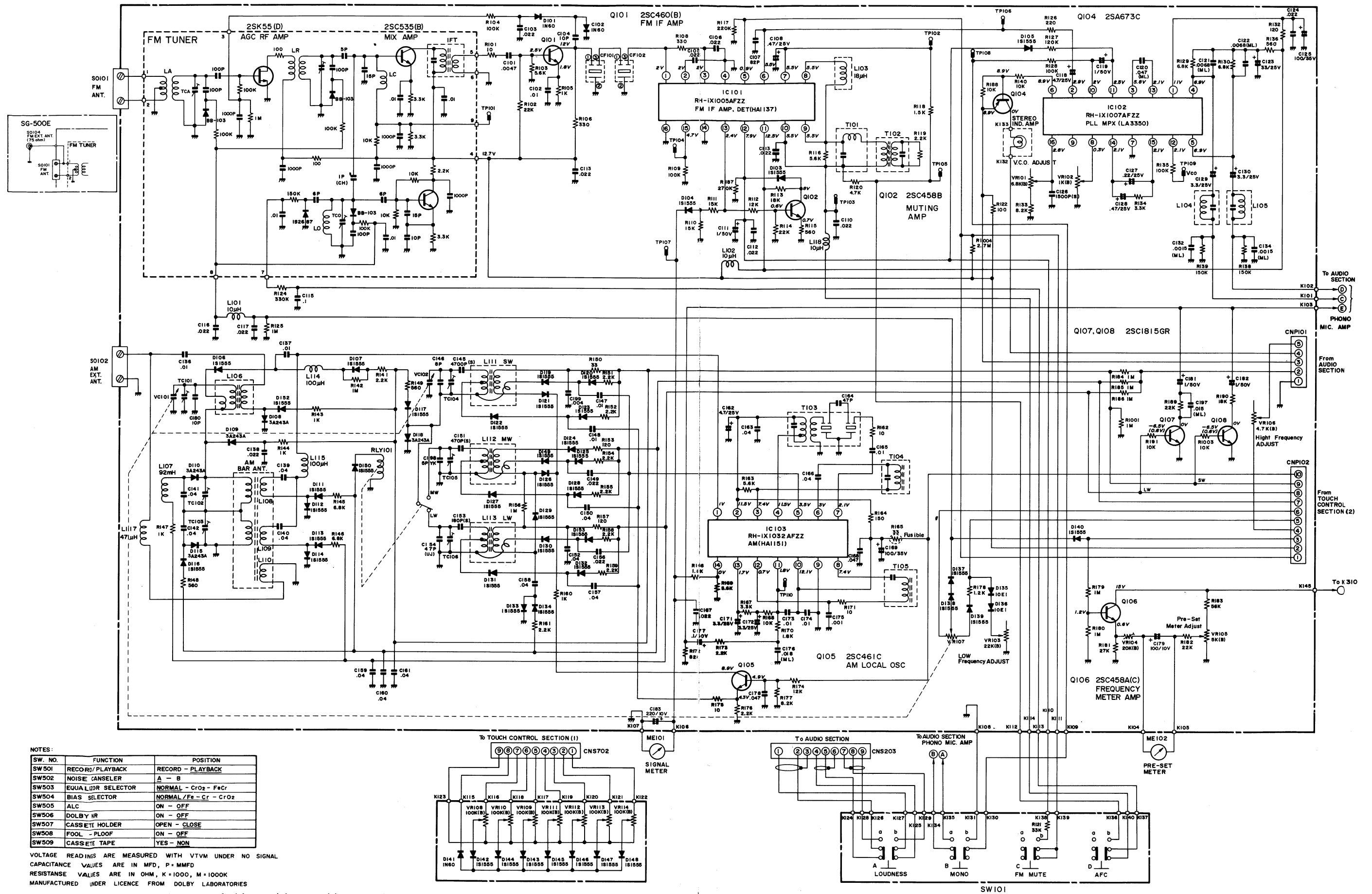
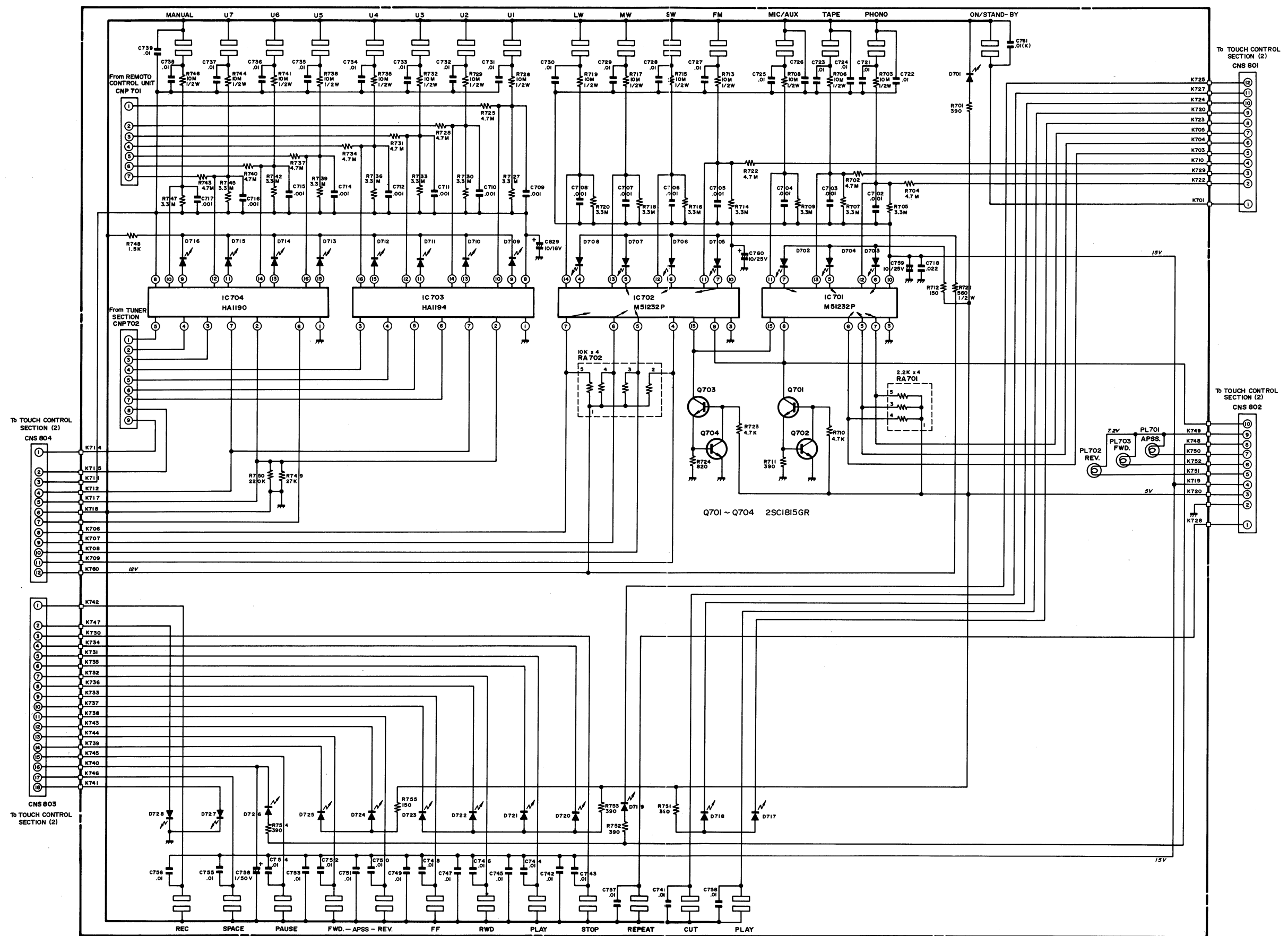


Figure 68-2

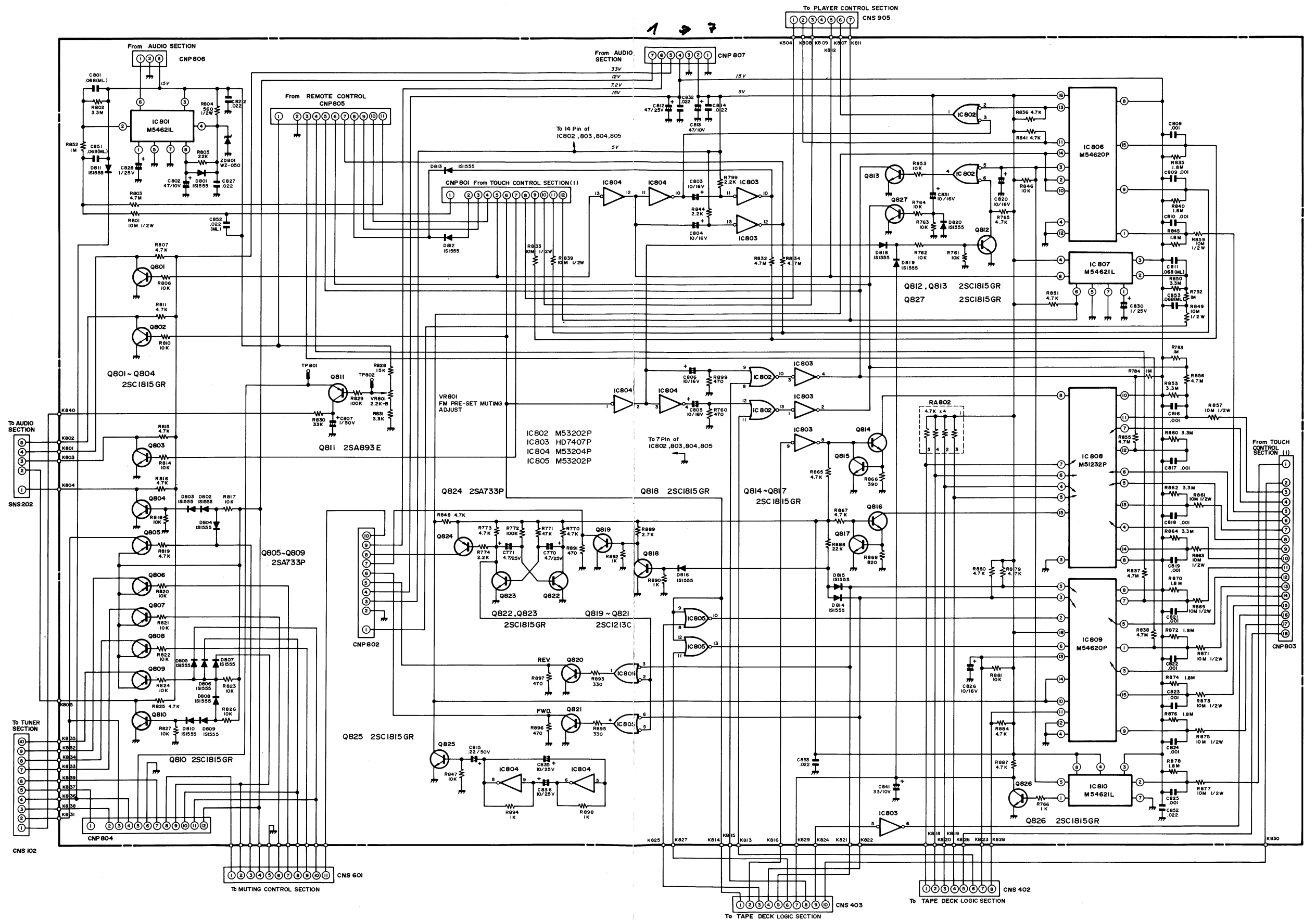






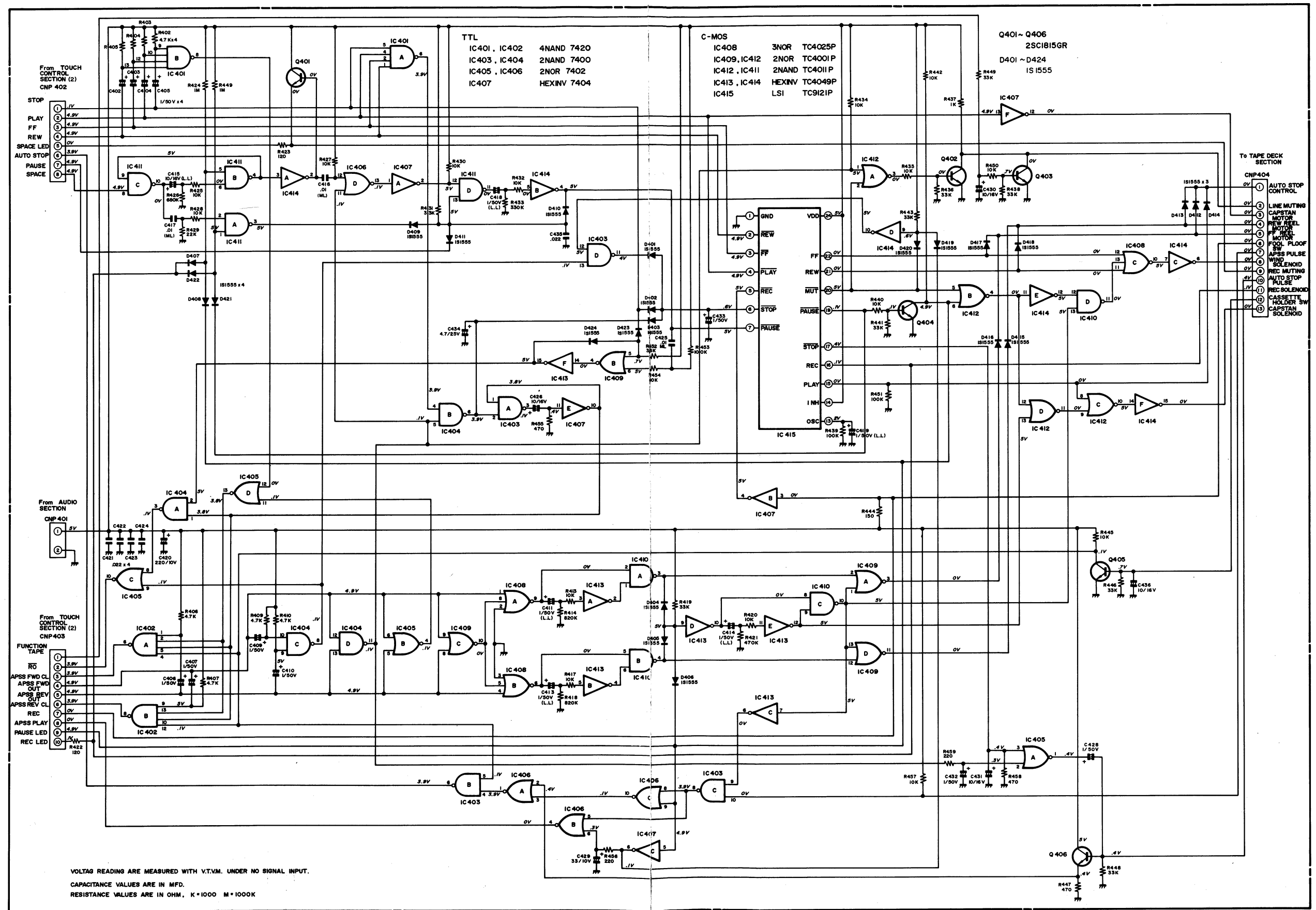
(Specifications of wiring diagrams of this model are subject to change for the improvement without prior notice.)

Figure 73-1 SCHEMATIC DIAGRAM (Touch Control Section 1)



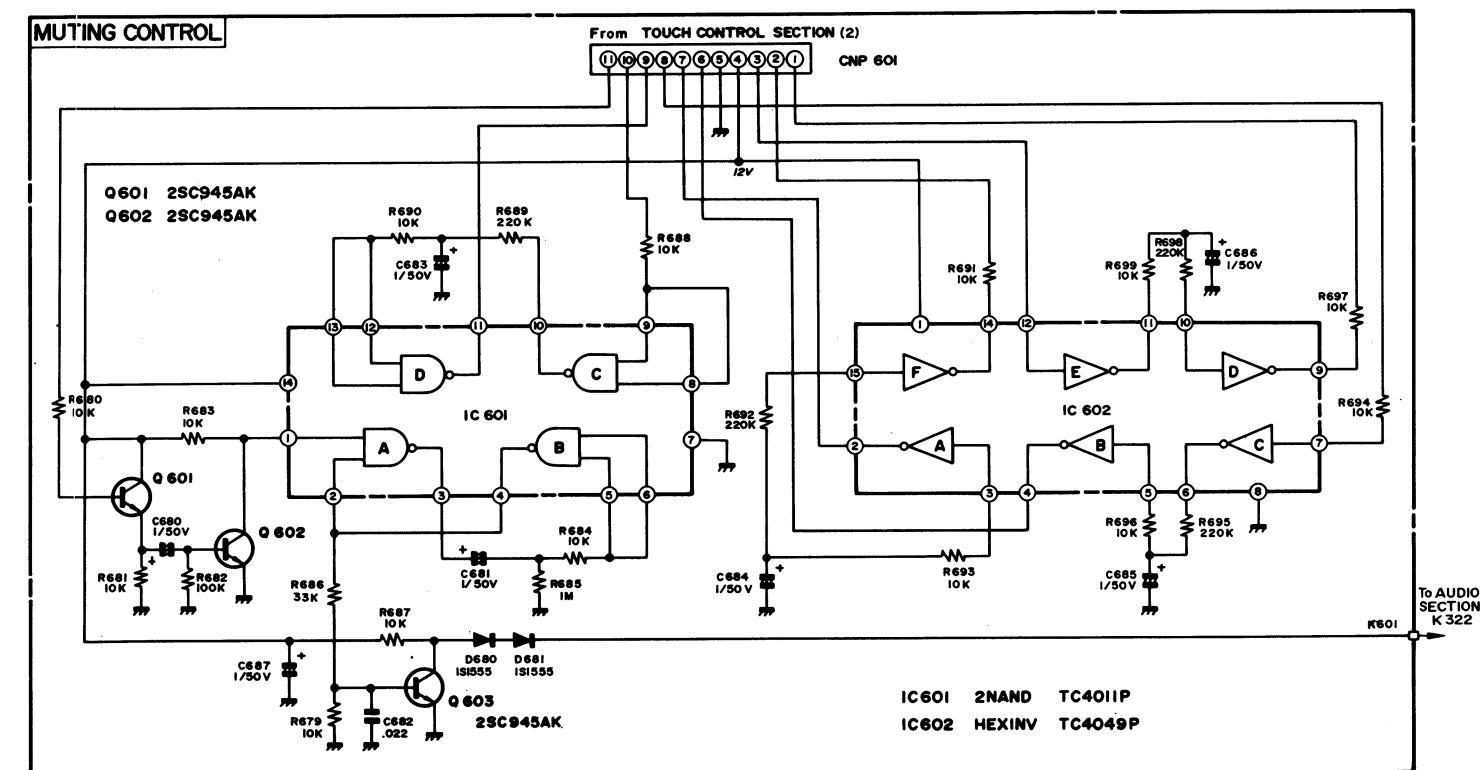
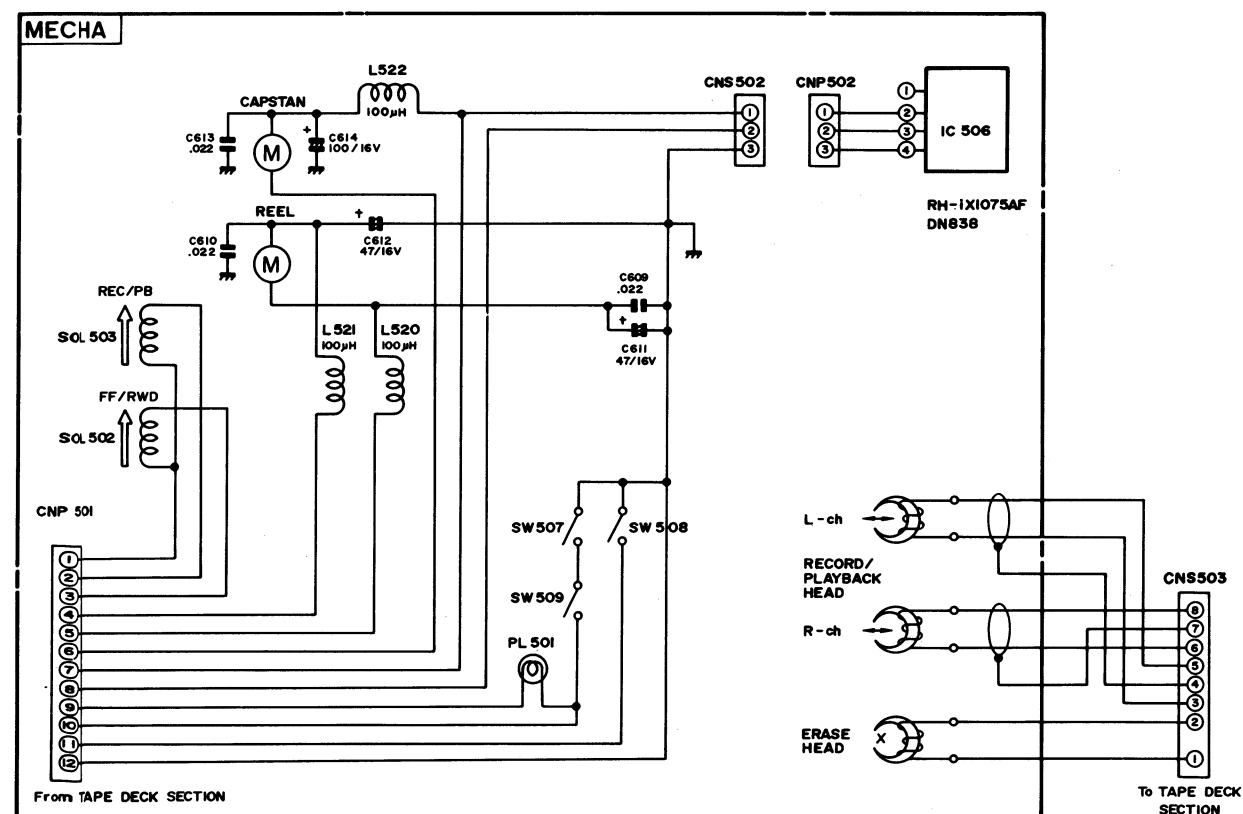
(Specifications of wiring diagrams of this model are subject to change for the improvement without prior notice.)

Figure 75-1 SCHEMATIC DIAGRAM (Touch Control Section 2)



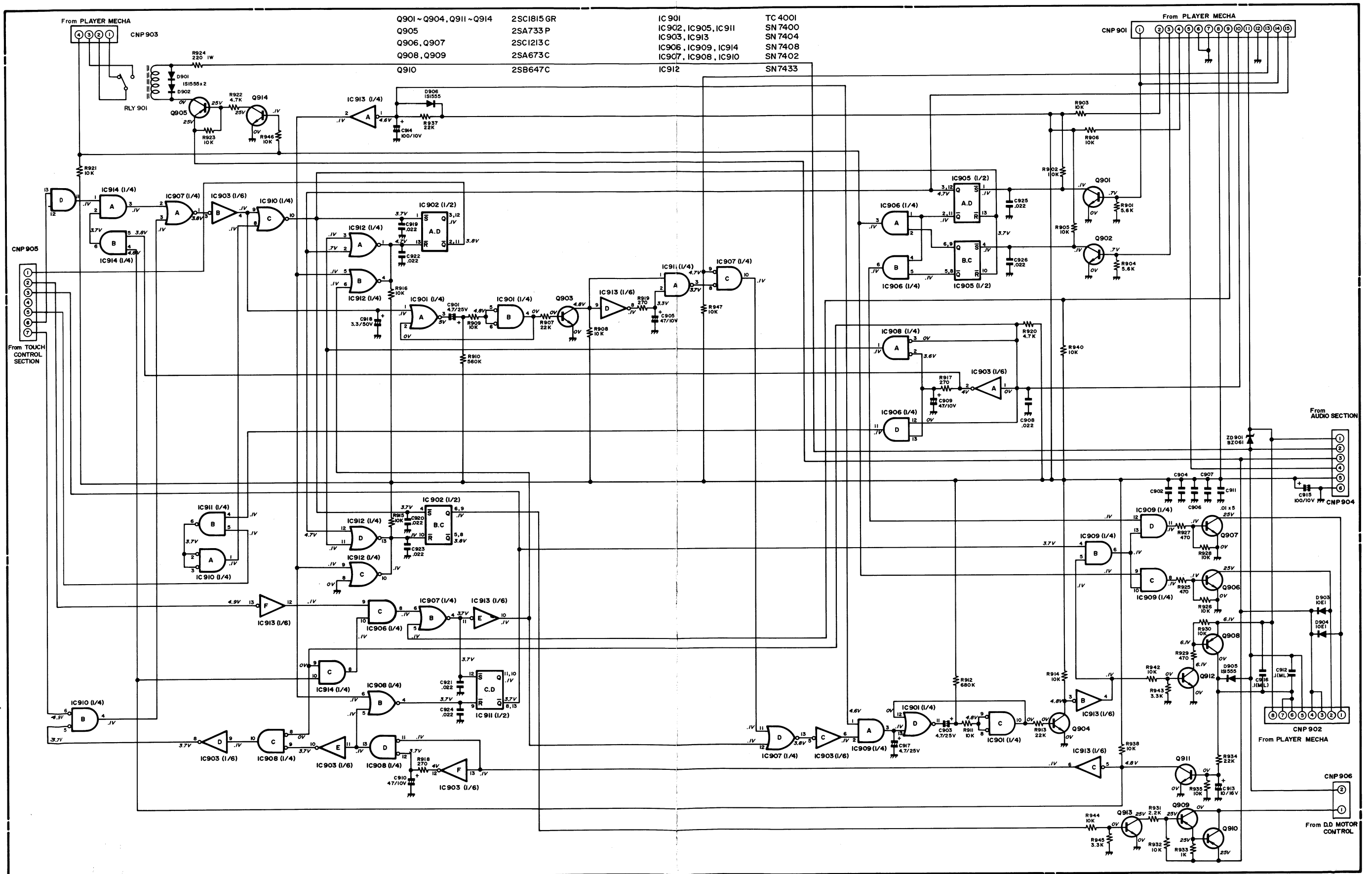
(Specifications of wiring diagrams of this model are subject to change for the improvement without prior notice.)

Figure 79-1 SCHEMATIC DIAGRAM (Tape Deck Logic Section)



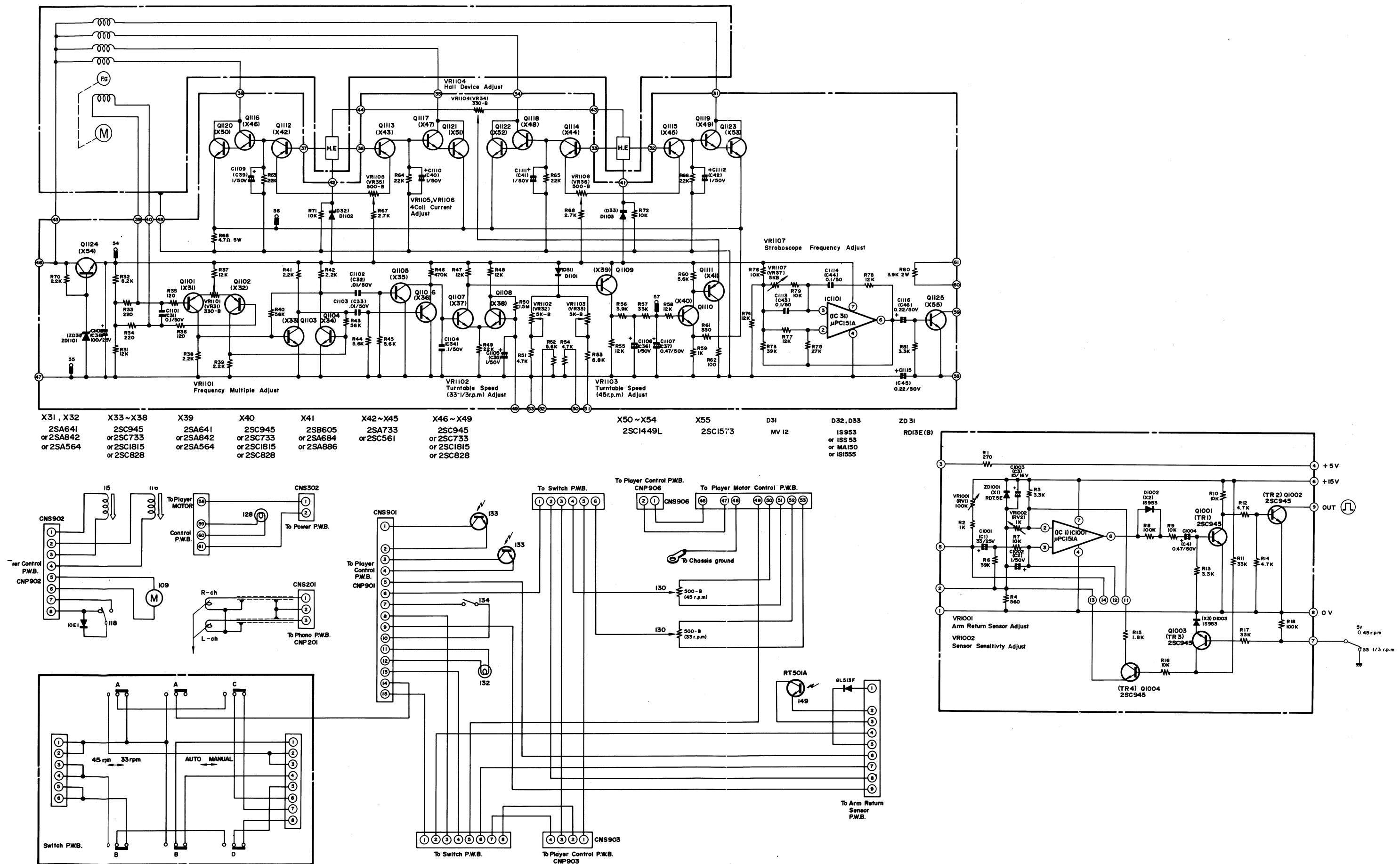
(Specifications of wiring diagrams of this model are subject to change for the improvement without prior notice.)

Figure 81-1 SCHEMATIC DIAGRAM (Tape Deck Mechanism/Muting Control Section)



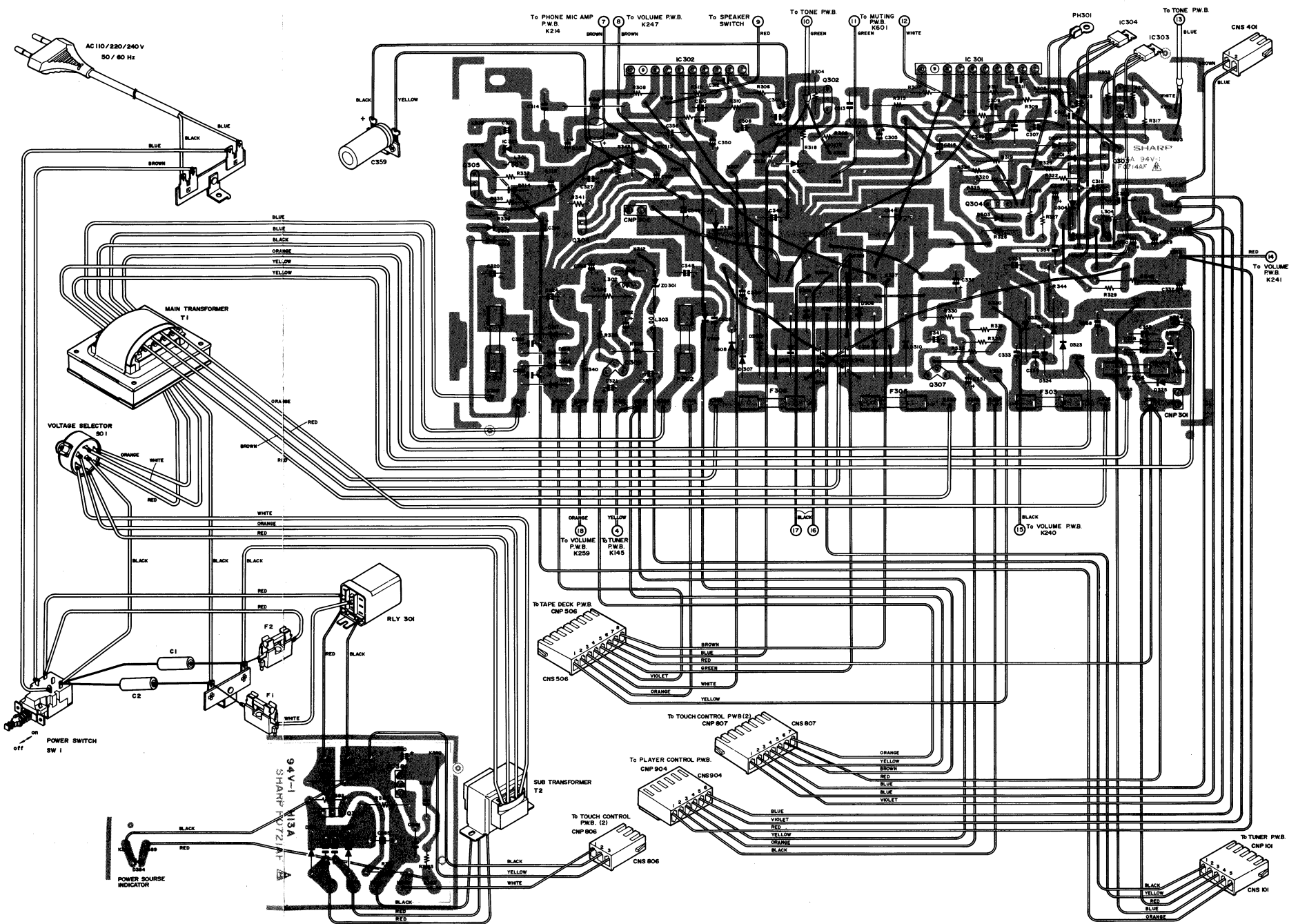
(Specifications of wiring diagrams of this model are subject to change for the improvement without prior notice.)

Figure 83-1 SCHEMATIC DIAGRAM (Player Control Section)



(Specifications of wiring diagrams of this model are subject to change for the improvement without prior notice.)

Figure 85-1 SCHEMATIC DIAGRAM (Player Motor Control/Arm Return Sensor/Player Mechanism Section)



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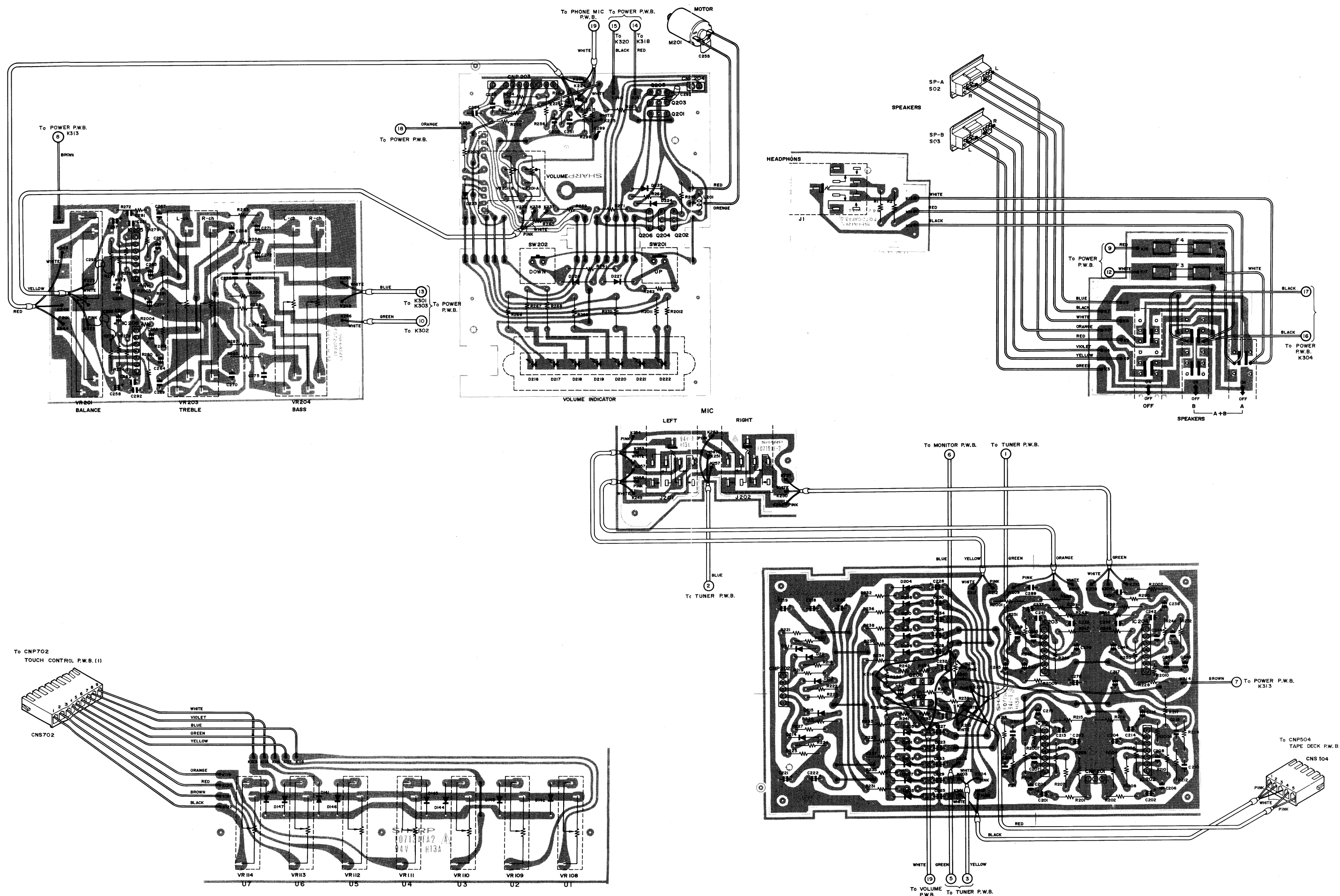


Figure 89-1 WIRING SIDE OF P.W. BOARD (Volume Control/Tone/FM Pre-set/Speakers Selector/Headphone/MIC/Pre-Amp.)

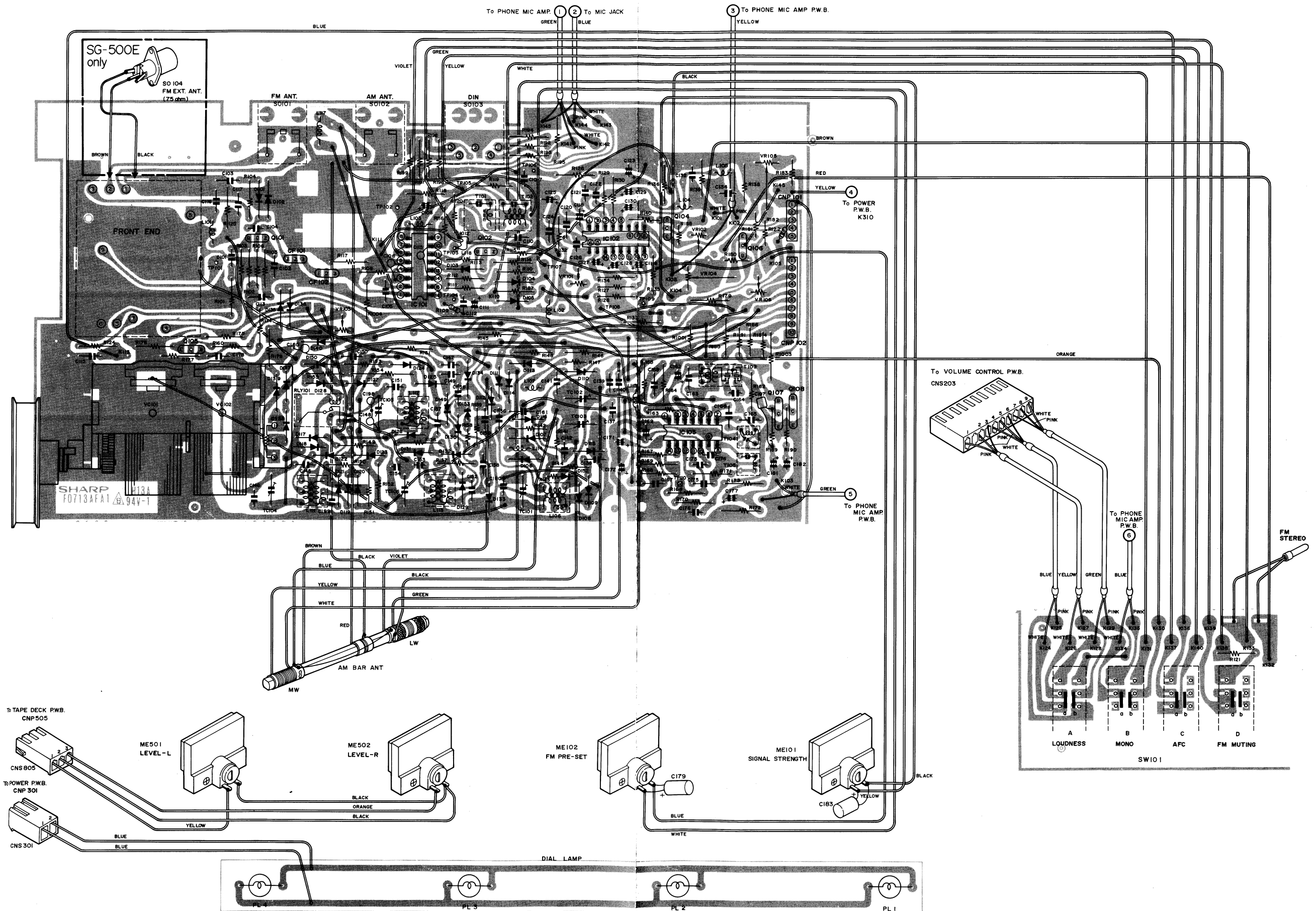


Figure 91-1 WIRING SIDE OF P.W. BOARD (Tuner/Lamp)

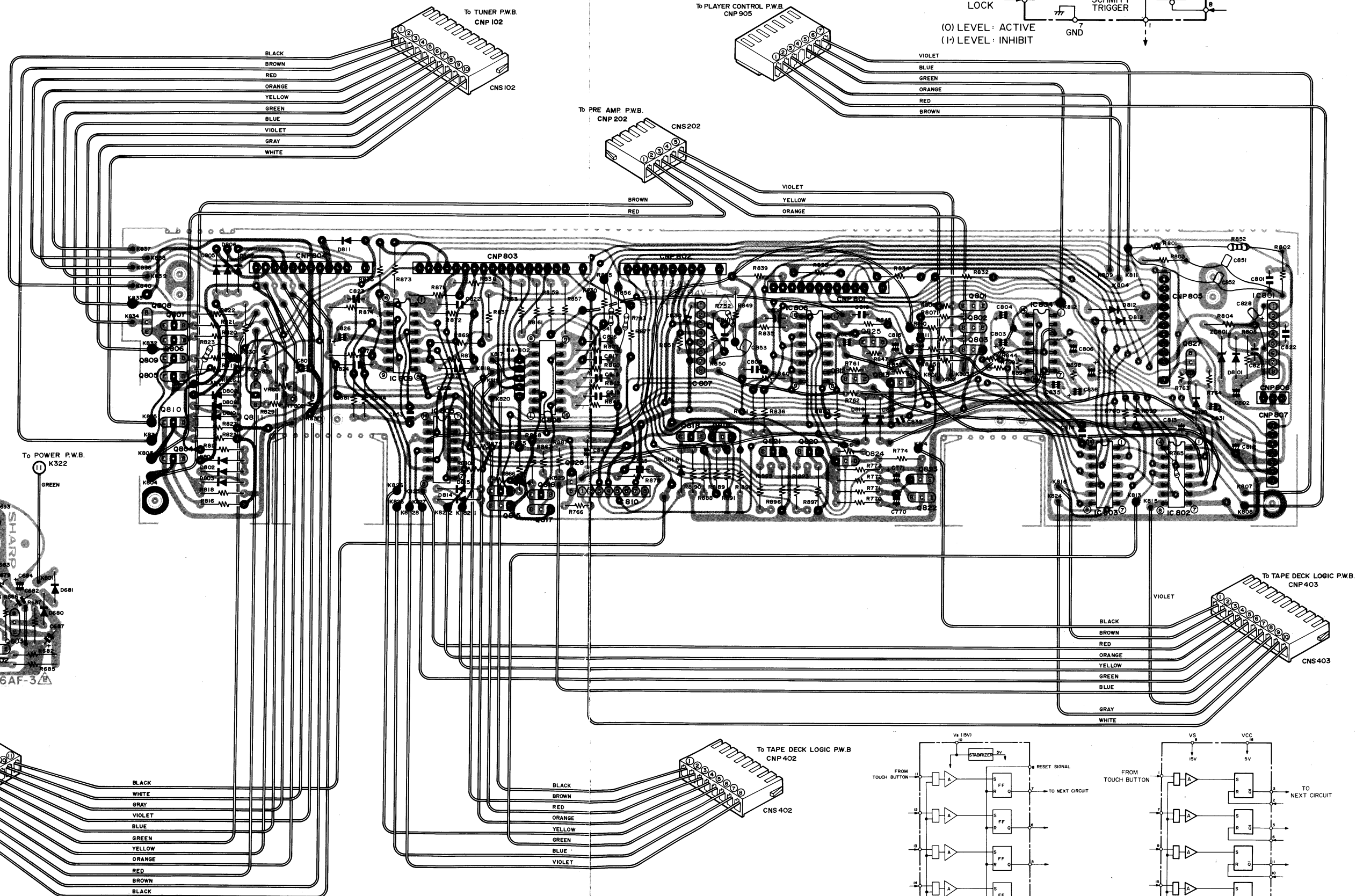
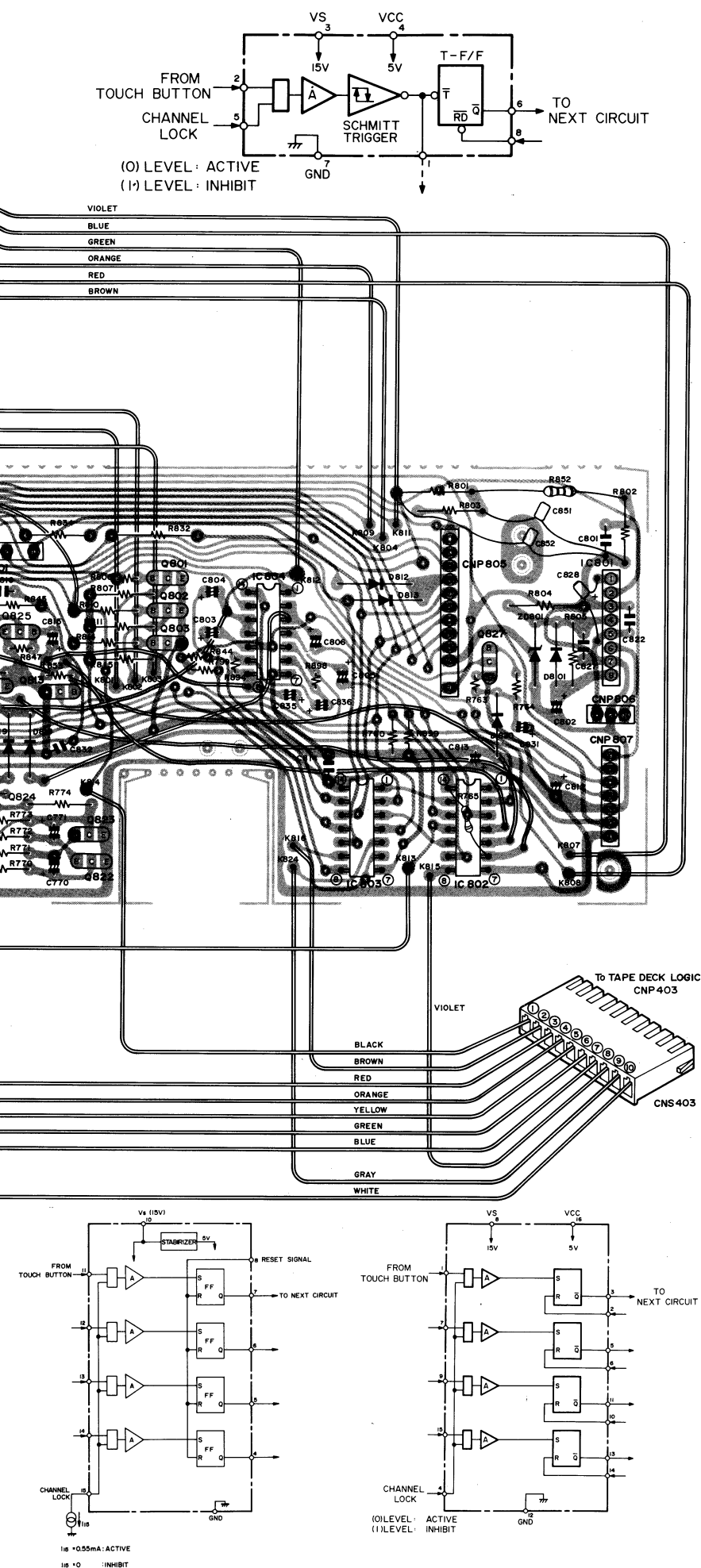


Figure 95—1 WIRING SIDE OF P.W. BOARD (Touch Control 2/Muting Control)



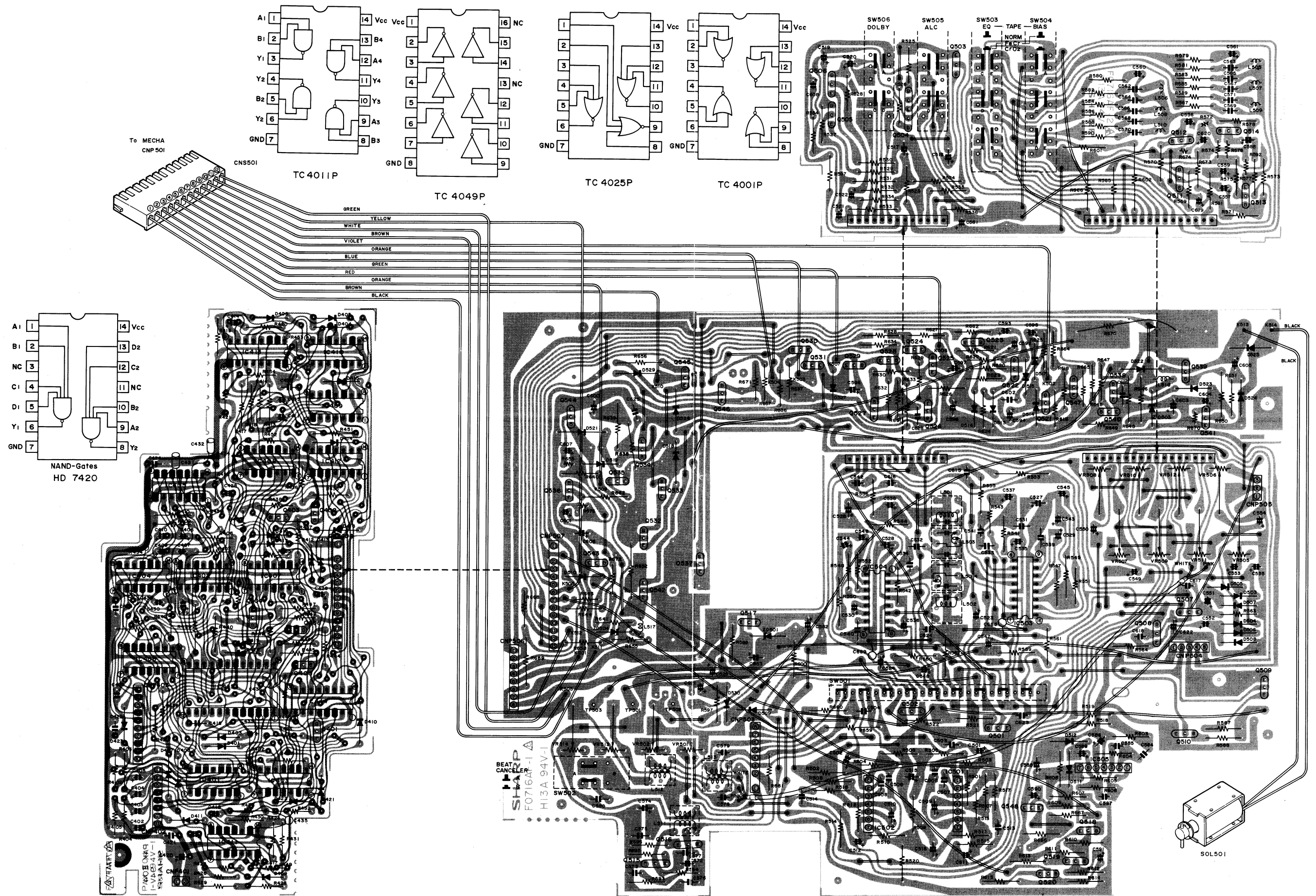
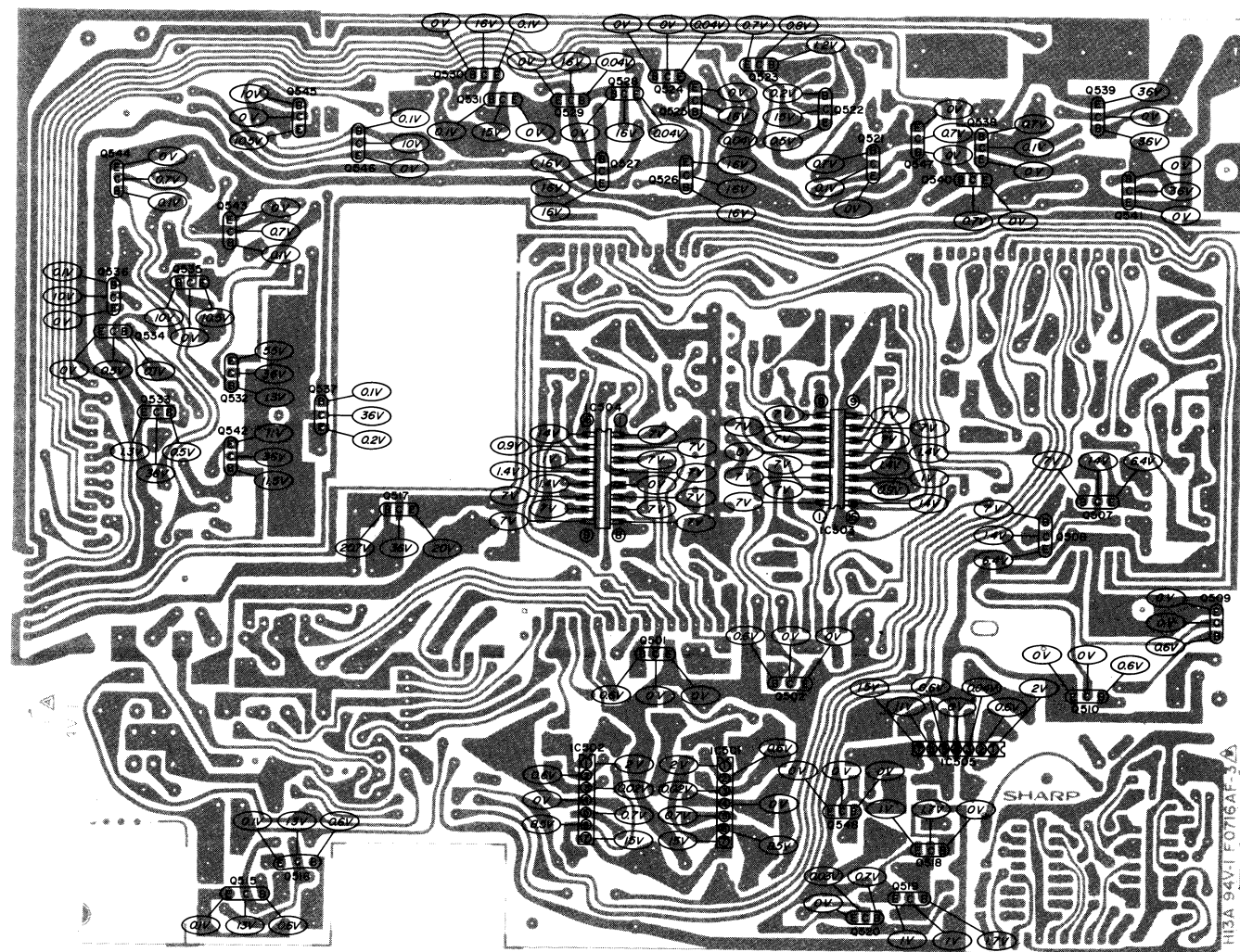


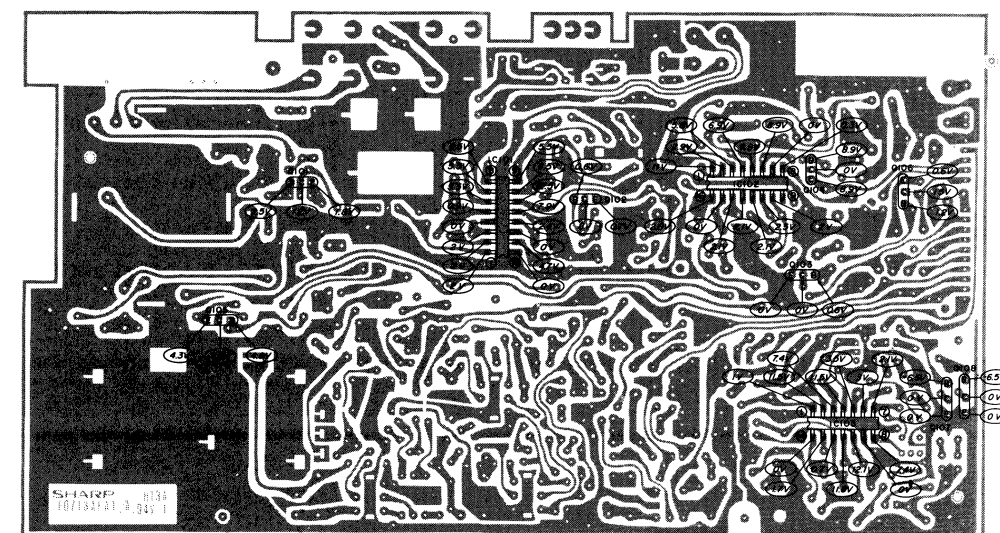
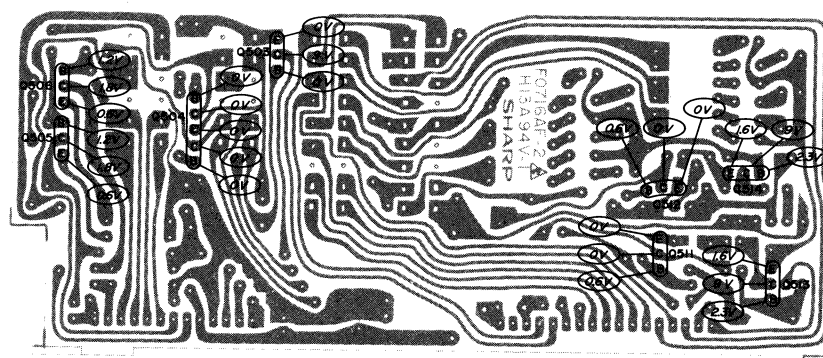
Figure 97-1 WIRING SIDE OF P.W. BOARD (Tape Deck Logic/Tape Deck)



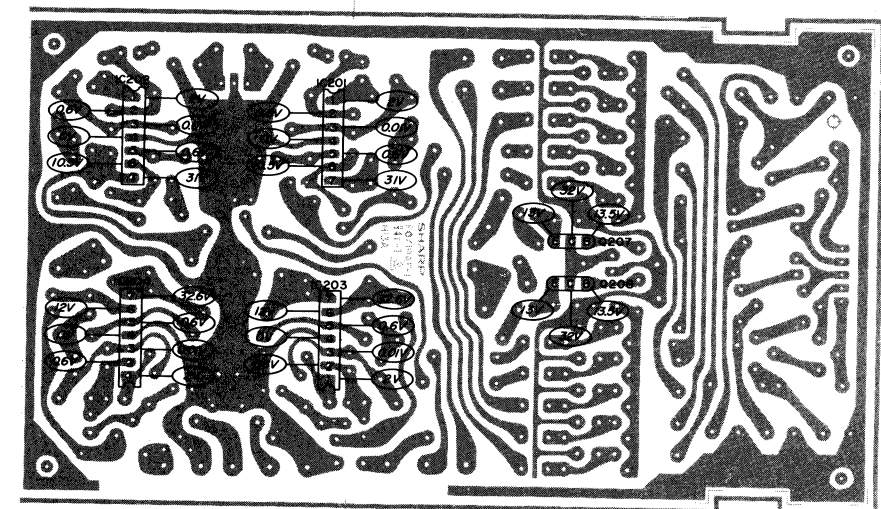
Figure 103-1 VOLTAGE GUIDE OF P.W. BOARD (Power/Sub-Power/Volume Control/Tone/Tape Deck Logic)



TAPE DECK



TUNER



PRE-AMP.

Figure 105-1 VOLTAGE GUIDE OF P.W. BOARD (Tape Deck/Tuner/Pre-Amp.)

TROUBLE SHOOTING GUIDE

- Check for the following when servicing the SG-500H.
 - 1) Check whether voltage supply to the section (in trouble) is normal.
 - 2) Check if there is normal connection (socket and plug) among the sections.
 - 3) Check whether voltage supply to the IC and transistor of the section (in trouble) is normal.
 - 4) Check that the desired function has been selected.
 - 5) Check that the tape head is not stained.
 - 6) Check that at "TAPE" mode a tape is set at the holder in a proper way.
 - 7) Check that at "TAPE" mode a tape to be used for REC/PLAY operation is a recording-allowed one.
 - 8) Check that at "PHONO" mode a record disk is not deformed.
 - 9) Check whether at "PHONO" mode a record disk having the size other than 17 cm or 30 cm in diameter is used.
 - 10) Check that the fuses at each section are rated ones.

- For assuring a better Dolby NR effect, the parts concerned are specified in their errors as follows: check that they are normal ones at your servicing.

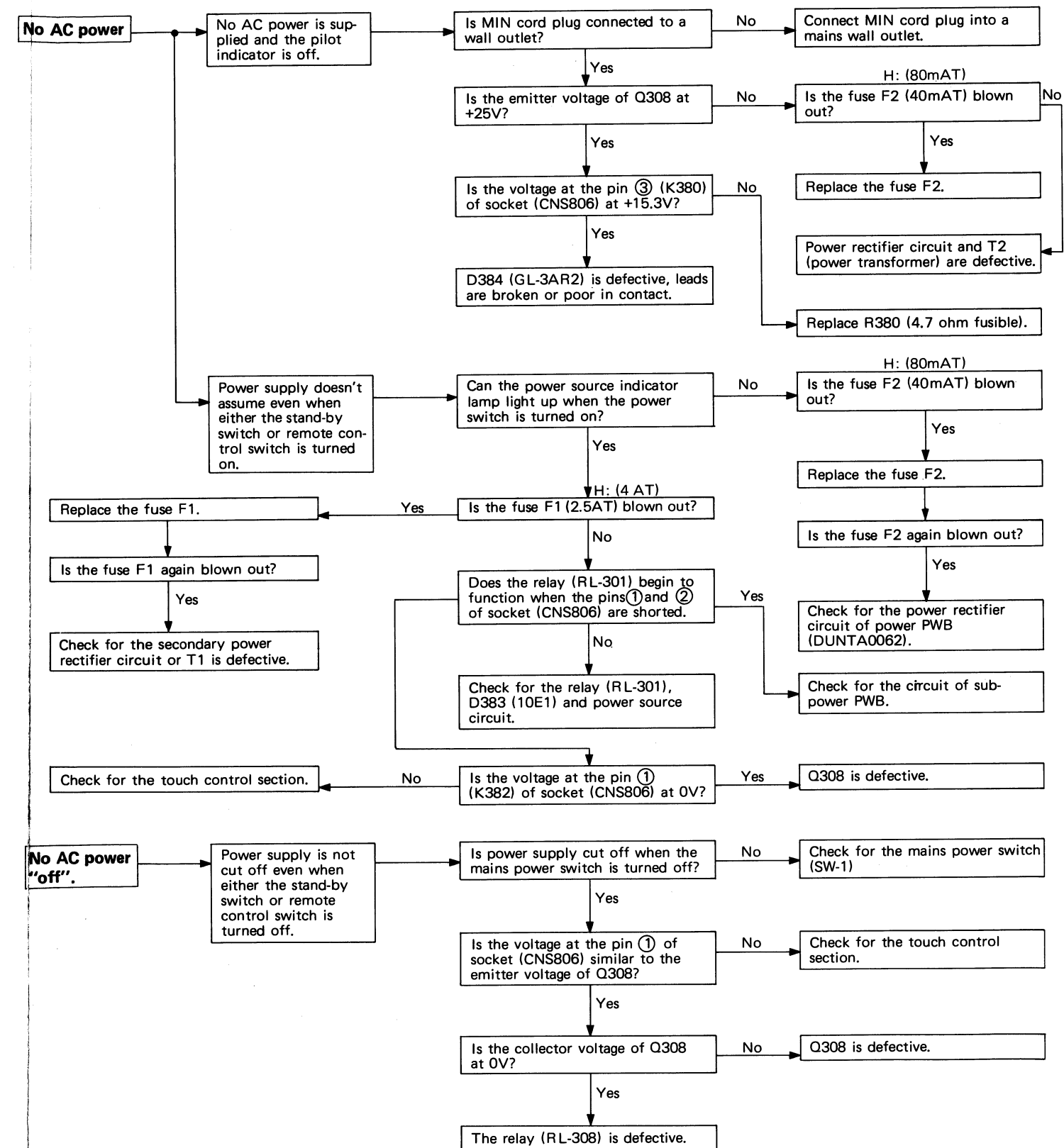
- The parts used in the Dolby NR peripheral circuits must be within the following rating.
 - a) Within an error of $\pm 5\%$: R541 ~ 544, C531 ~ C534, C539 ~ C542, R549, R550, R547, R548
 - b) Within an error of $\pm 10\%$: C543 ~ C546 and all resistors

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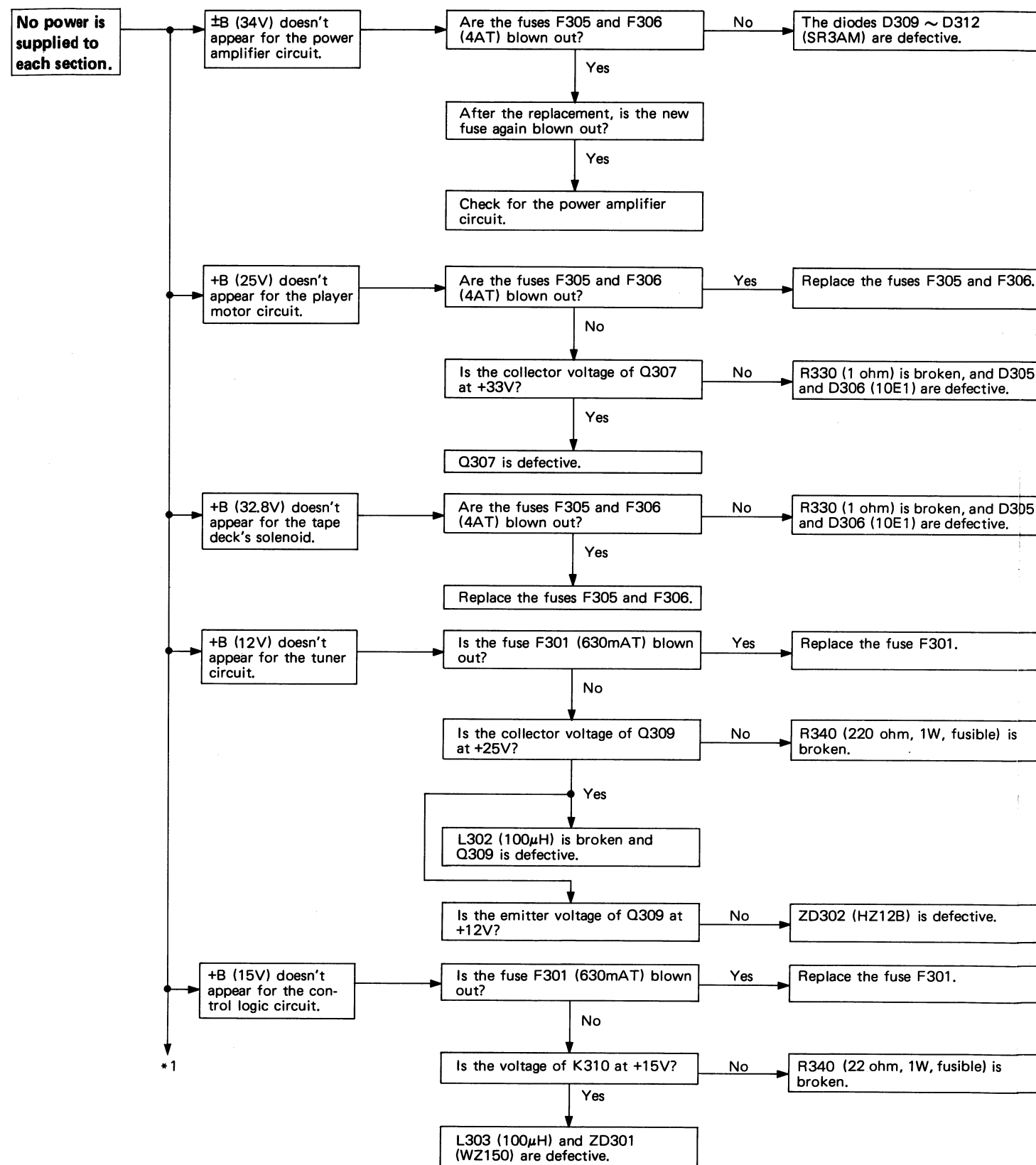
TROUBLE FLOW CHART	108-119
SIGNAL FLOW CHART	120-128
CONNECTION GUIDE	129-134

TRUBLE SHOOTING GUIDE

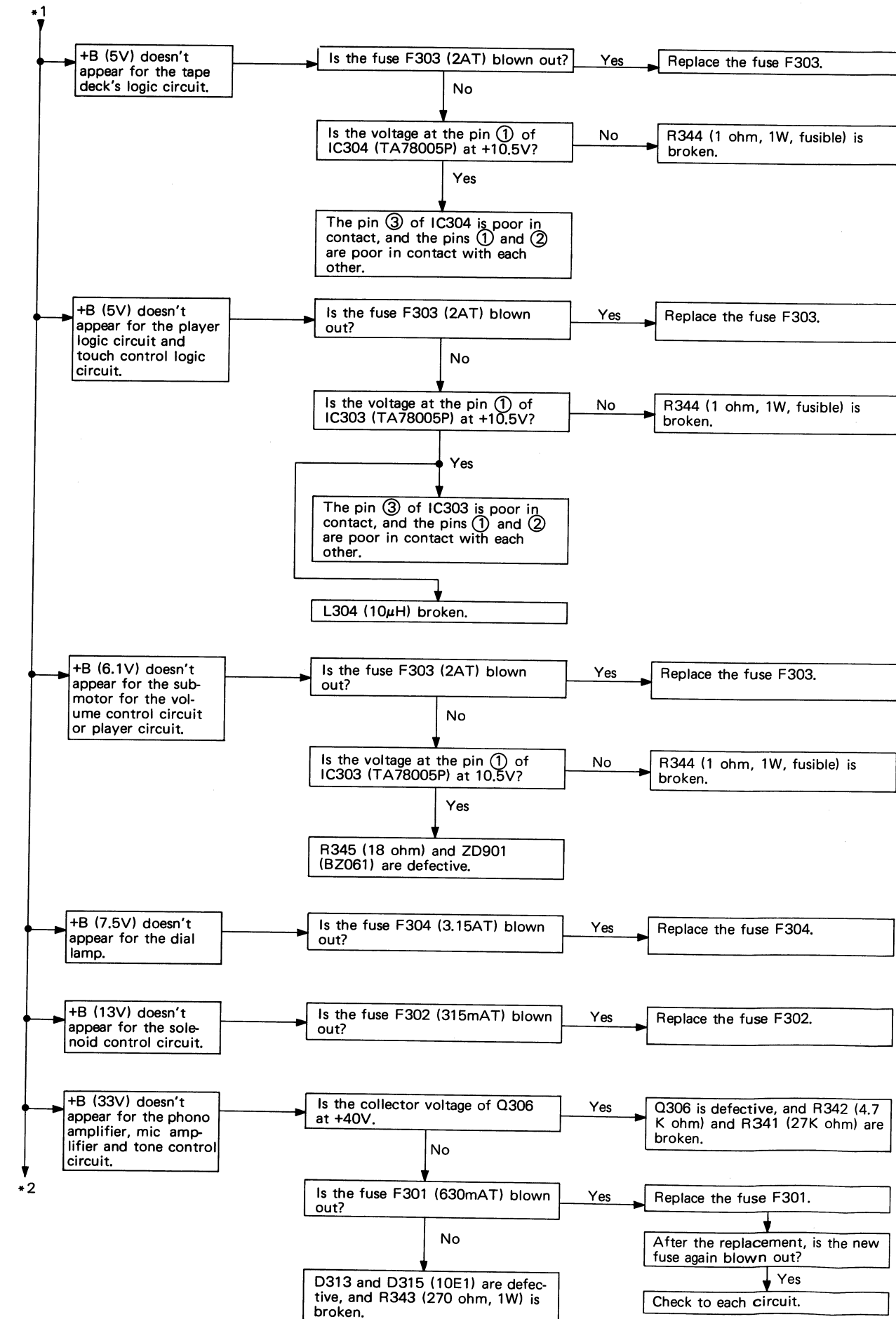
POWER SUPPLY CIRCUIT



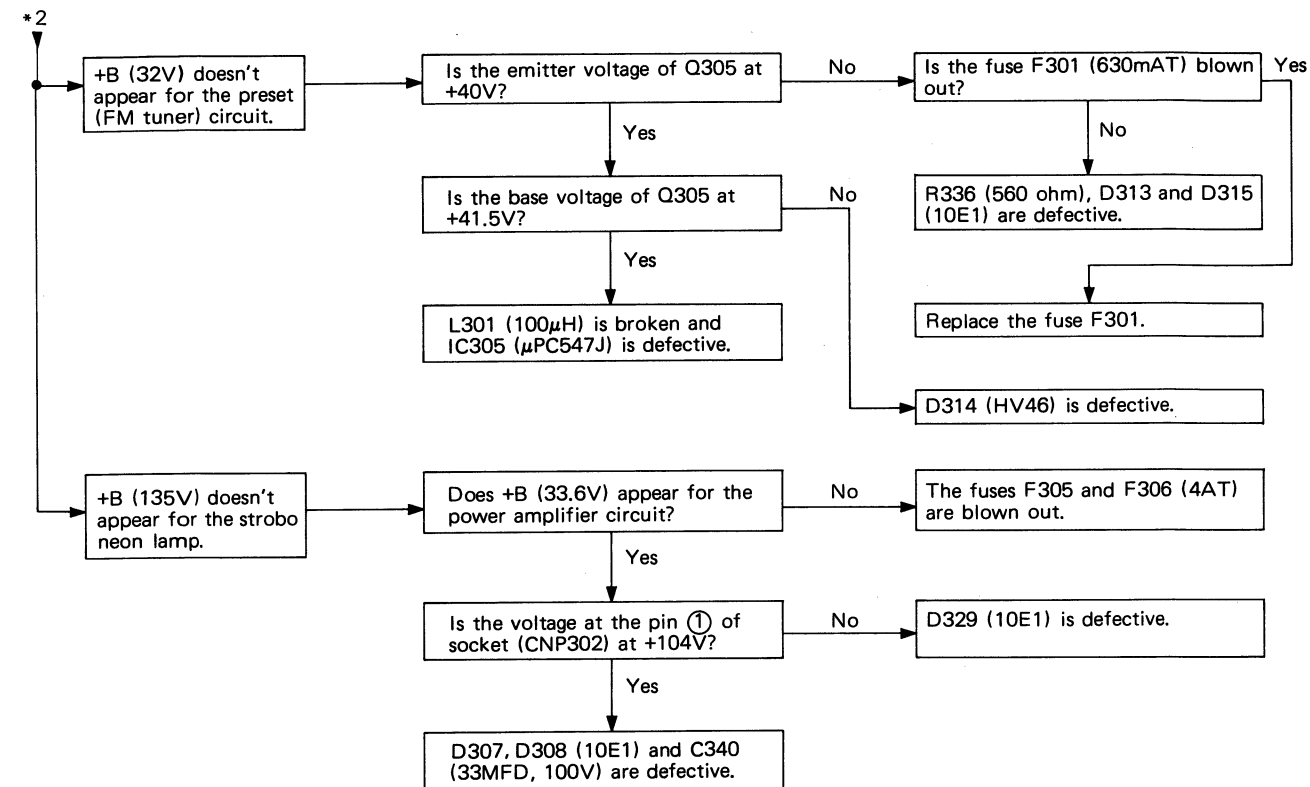
TROUBLE SHOOTING GUIDE



TROUBLE SHOOTING GUIDE

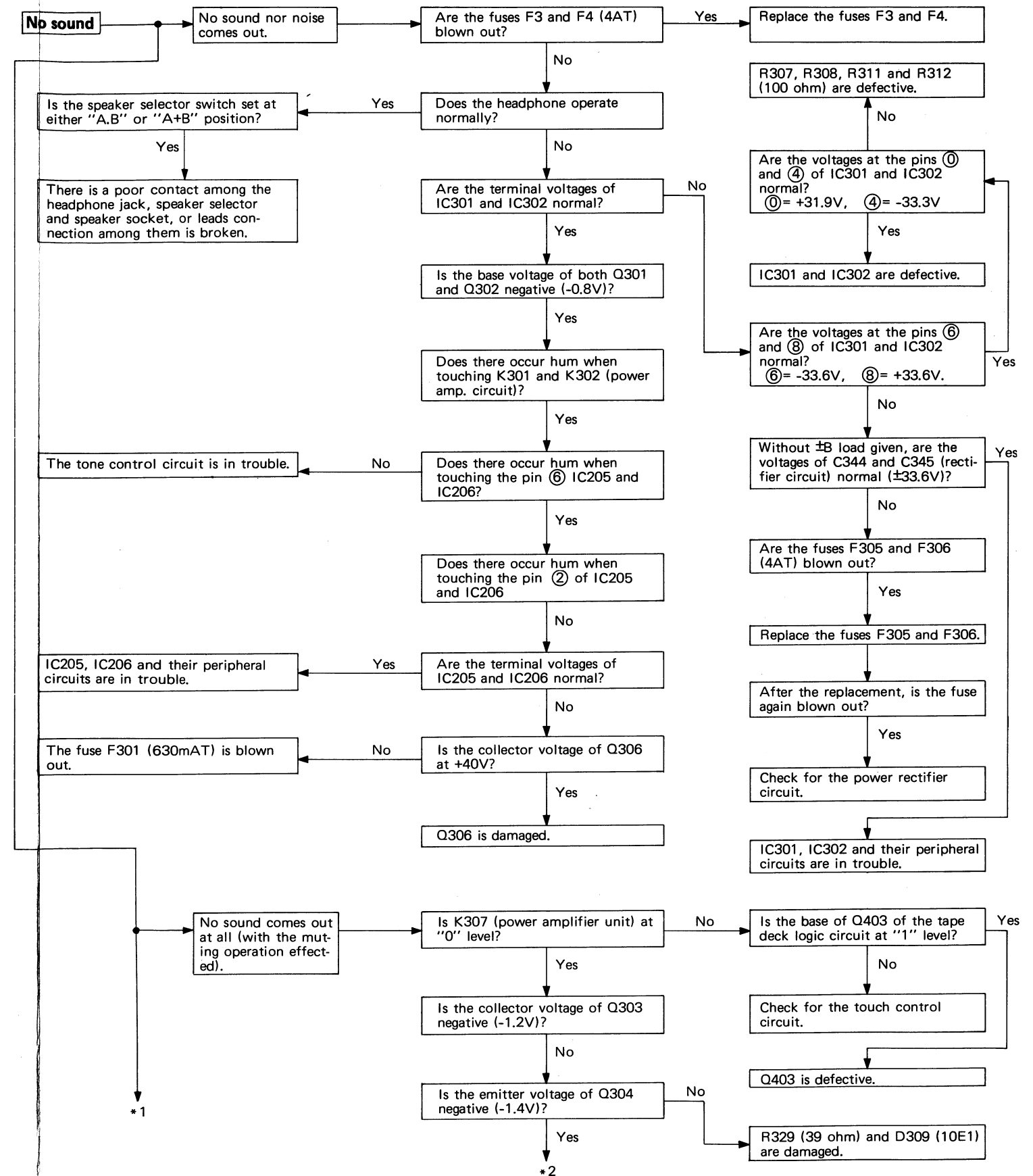


TROUBLE SHOOTING GUIDE

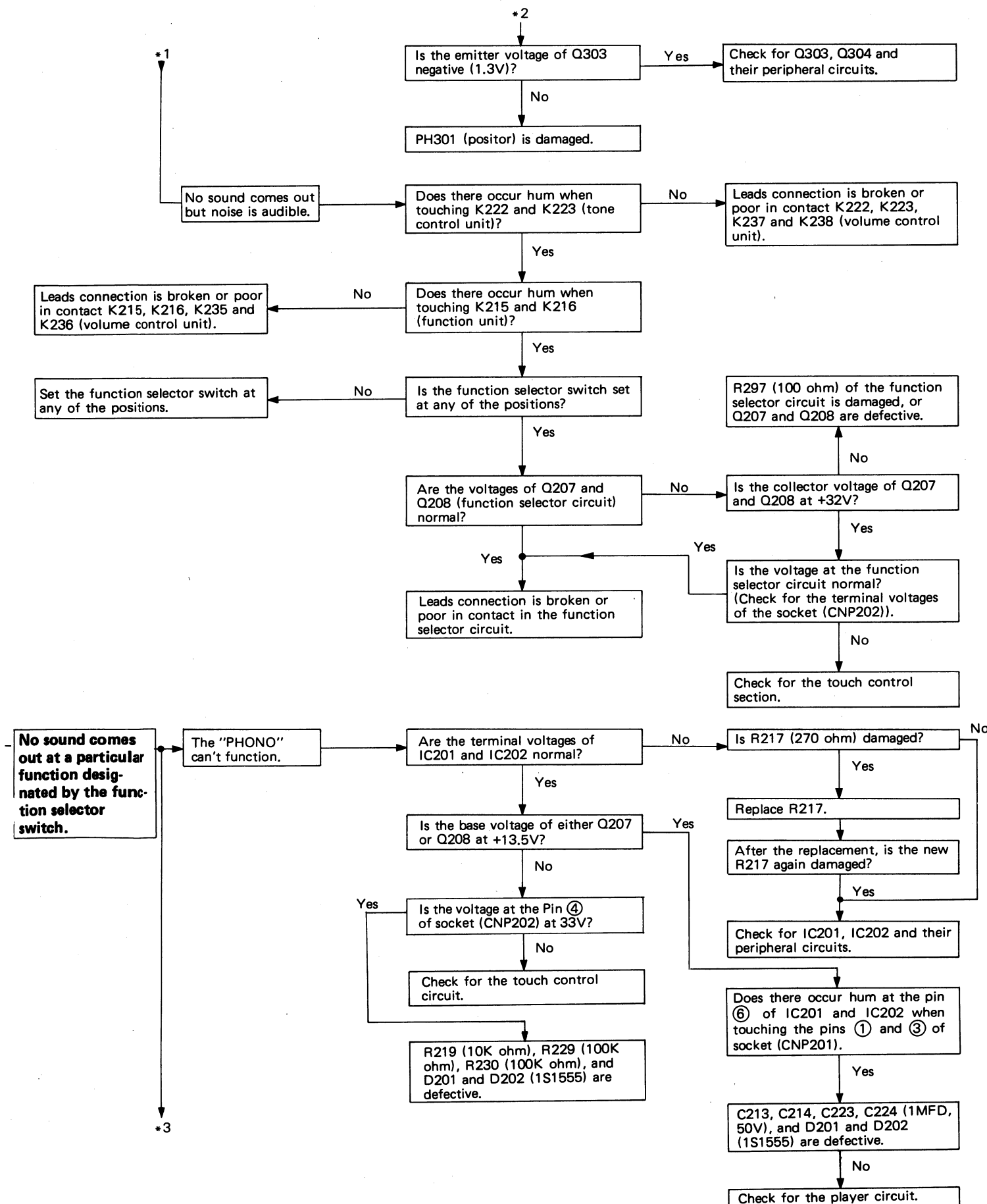


TRUBLE SHOOTING GUIDE

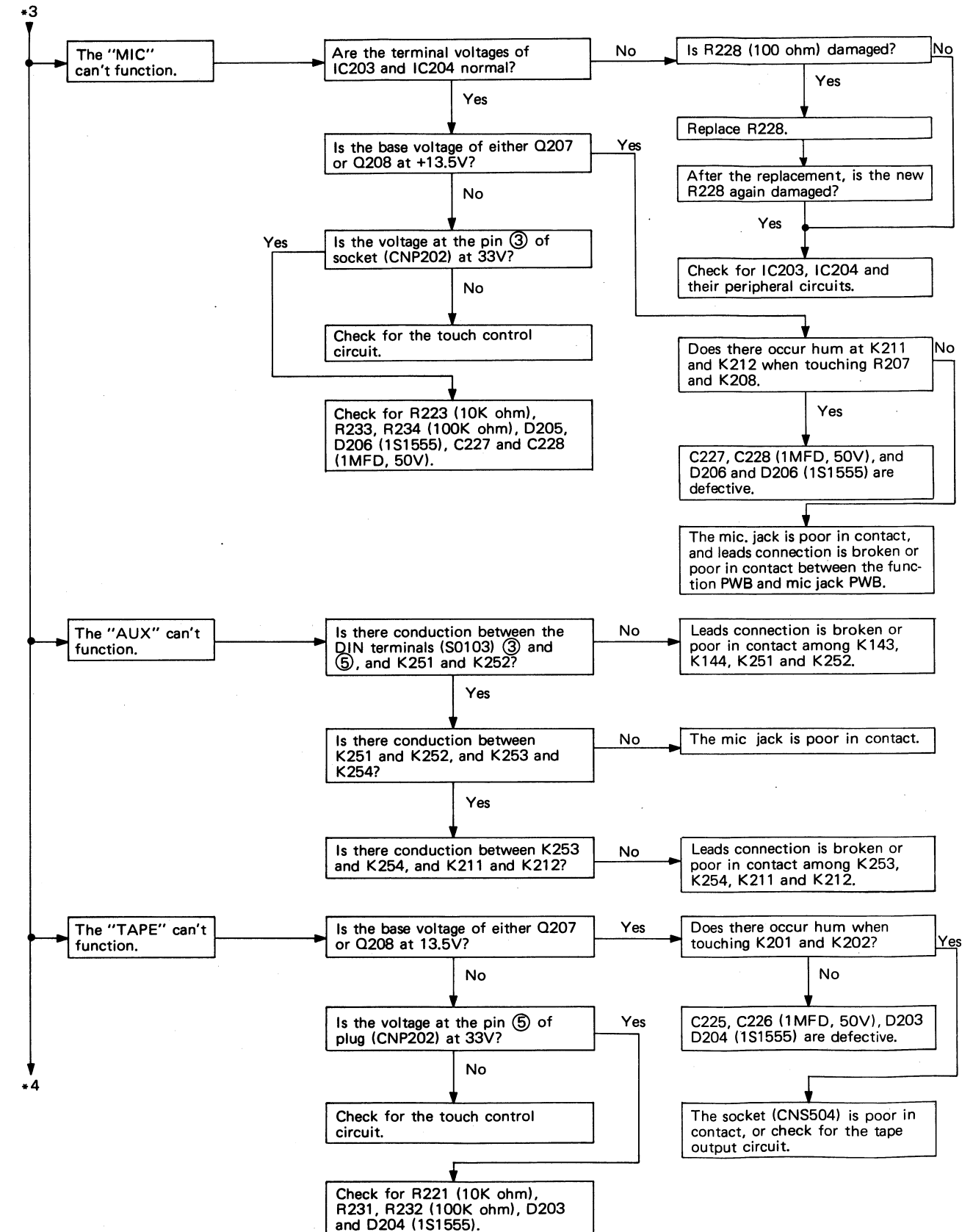
AUDIO CIRCUIT



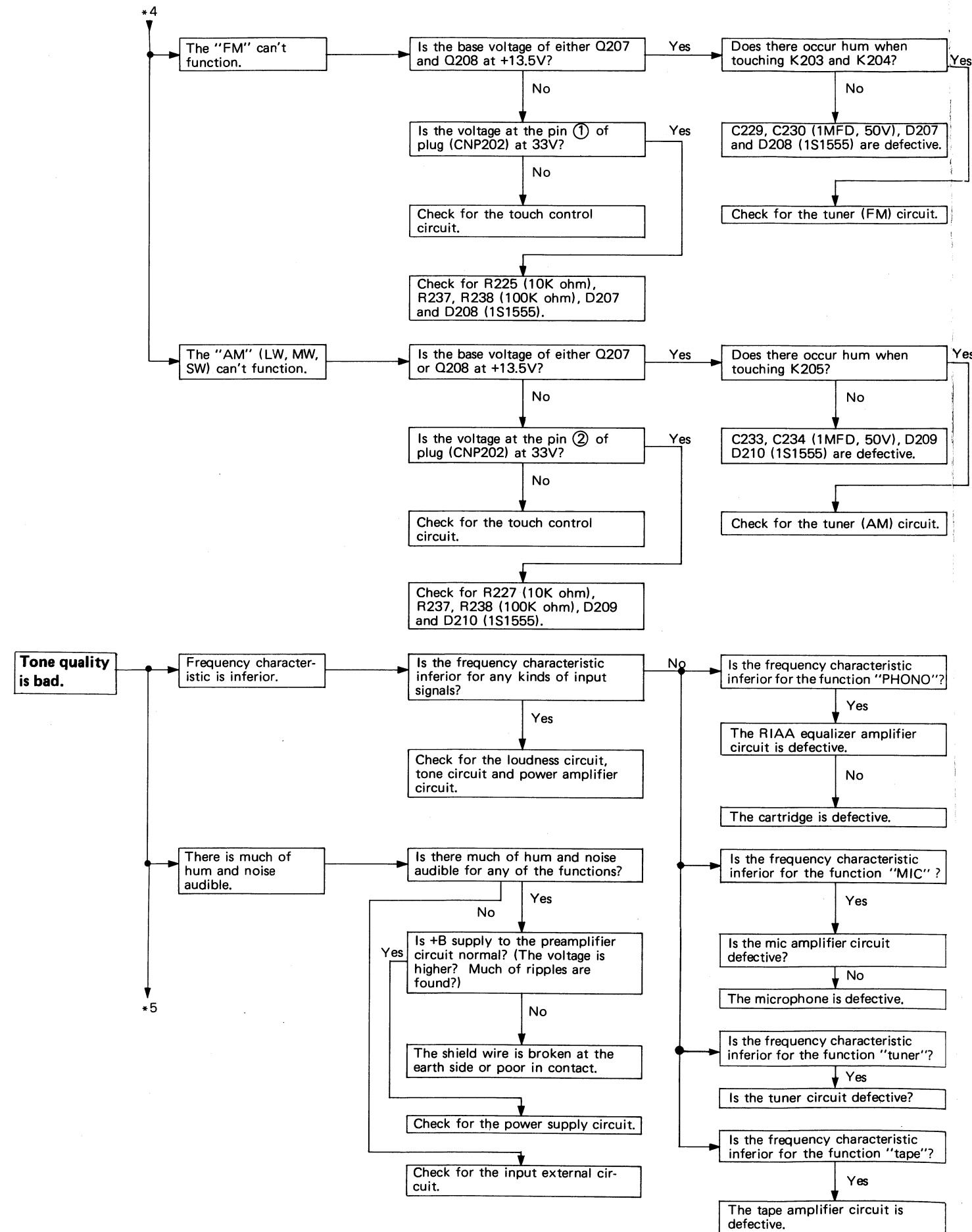
TROUBLE SHOOTING GUIDE



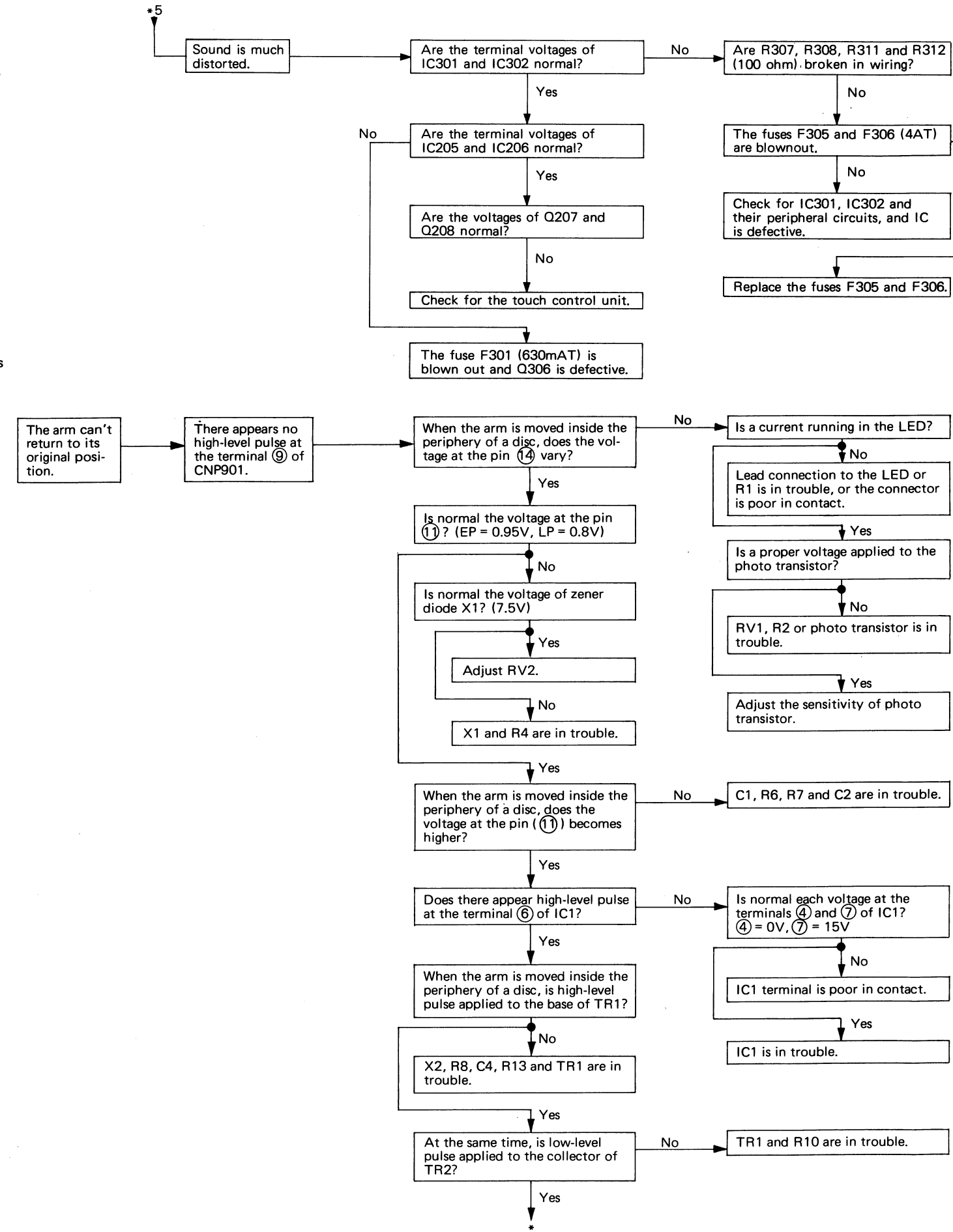
TROUBLE SHOOTING GUIDE



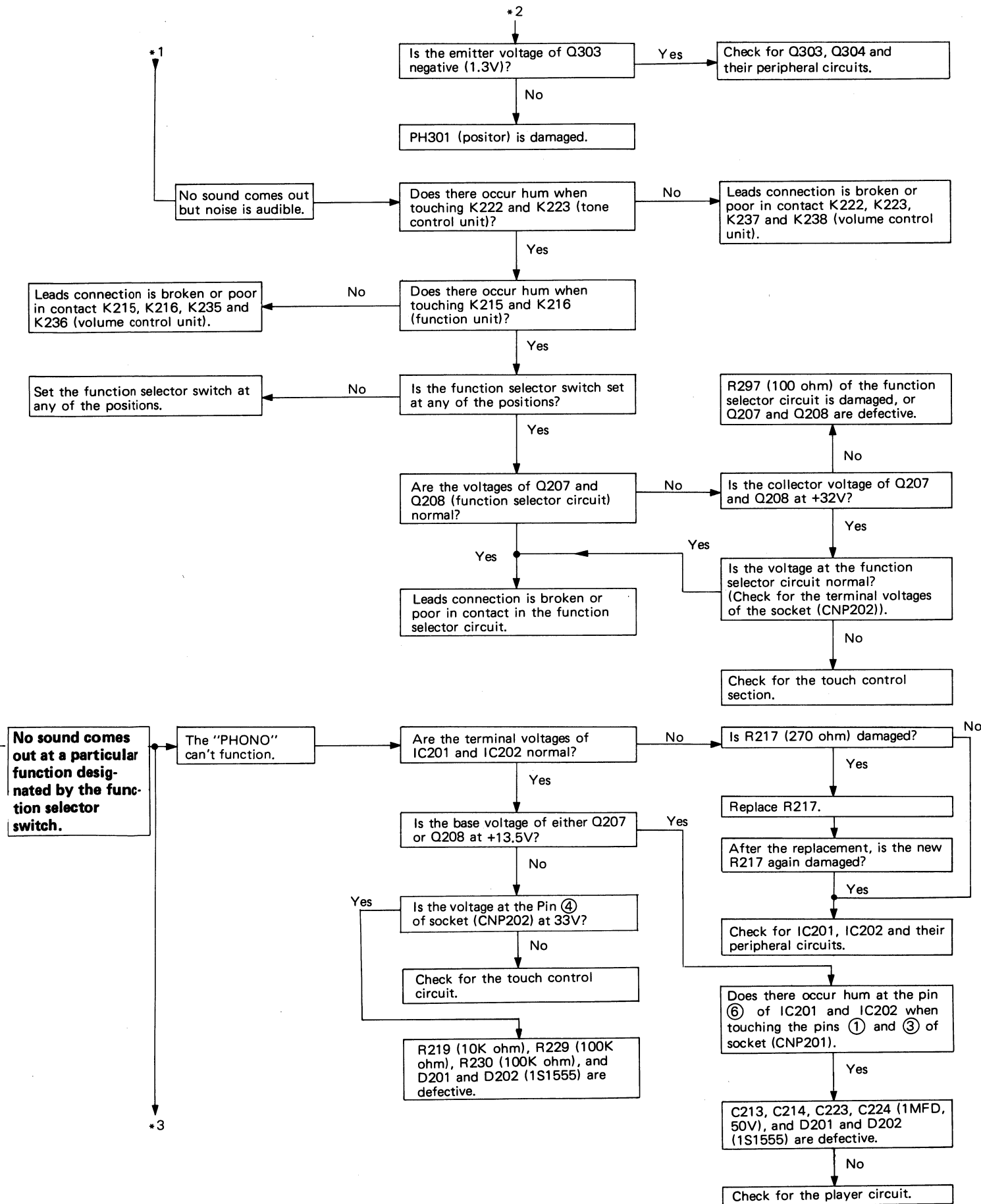
TROUBLE SHOOTING GUIDE



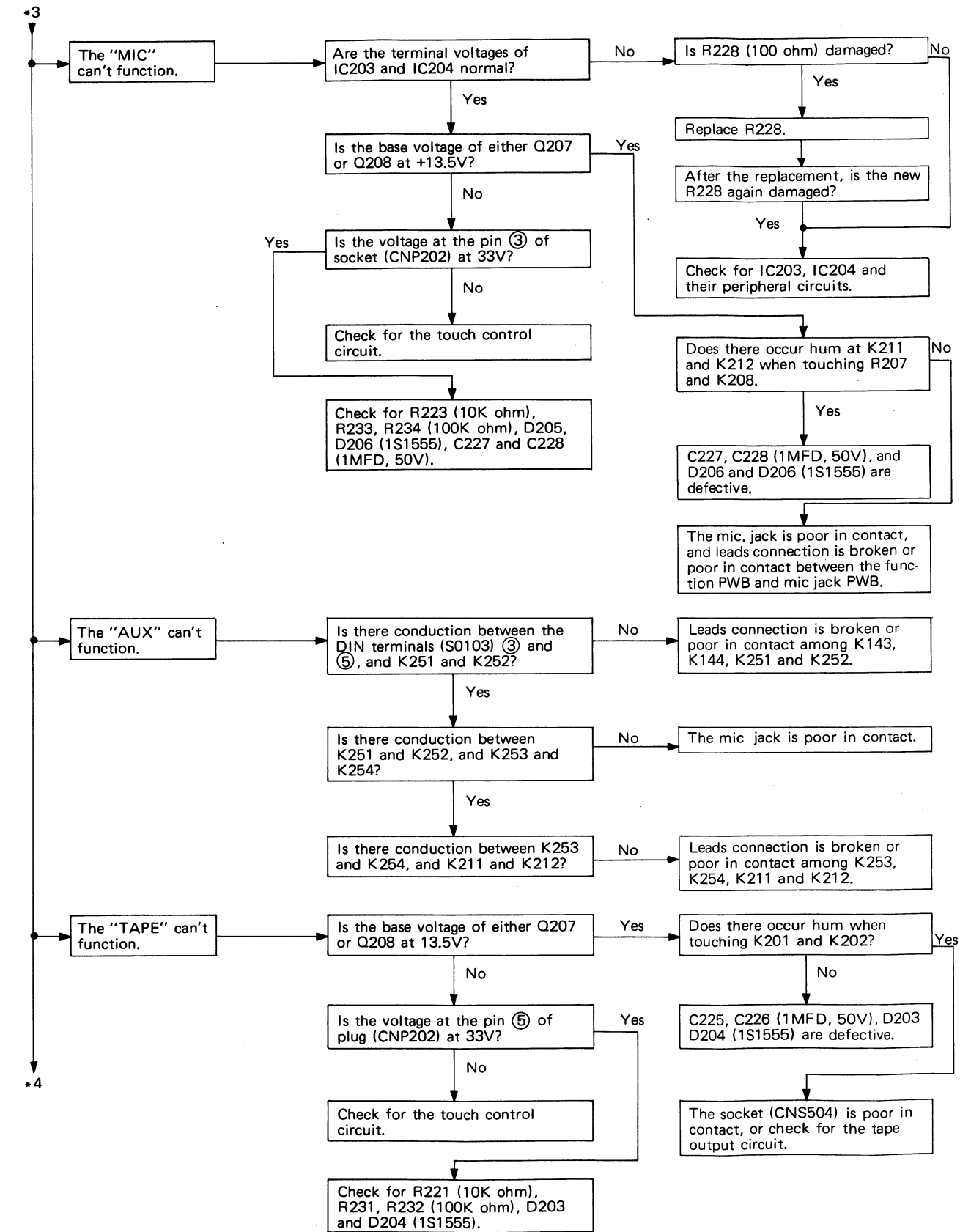
TROUBLE SHOOTING GUIDE



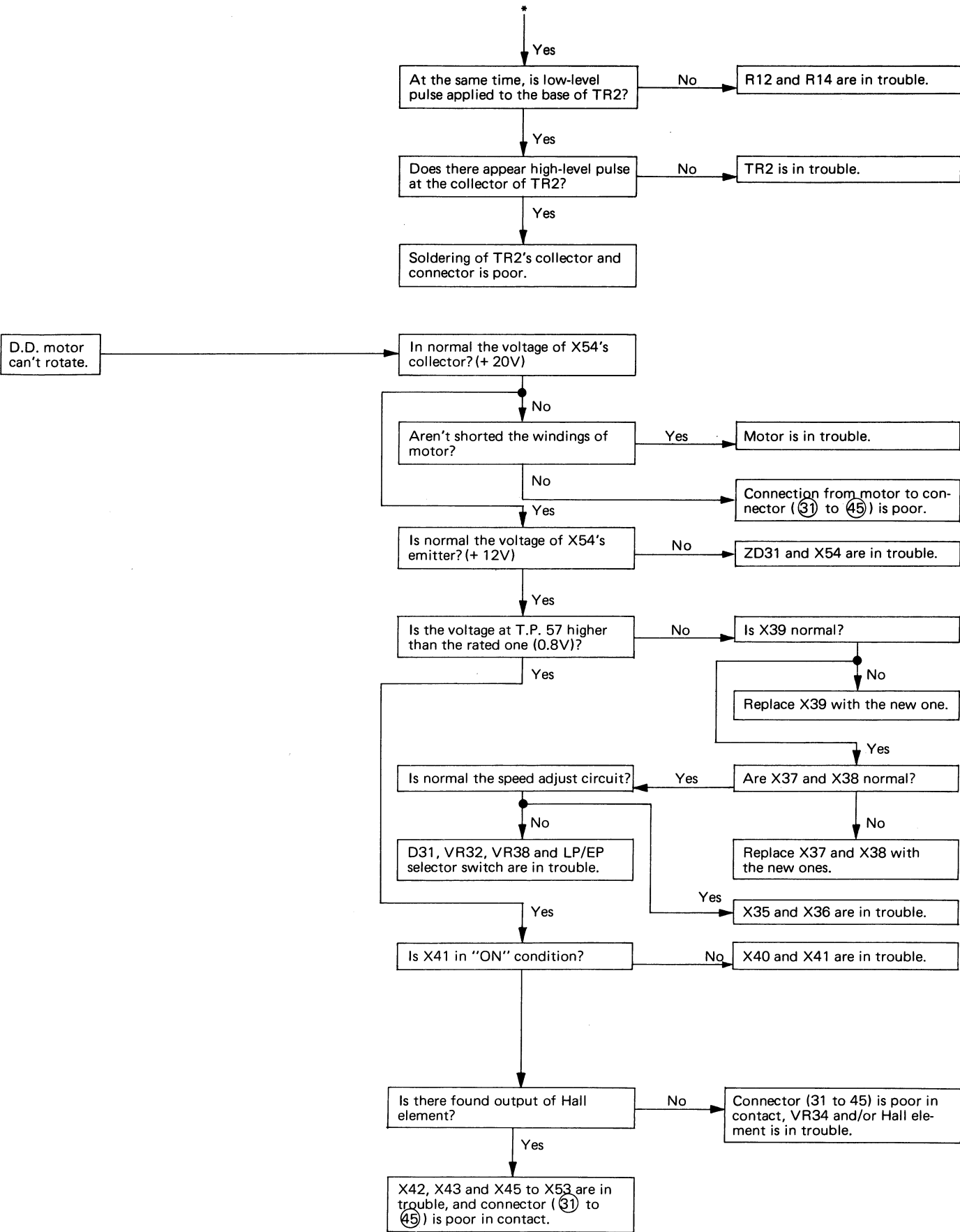
TROUBLE SHOOTING GUIDE



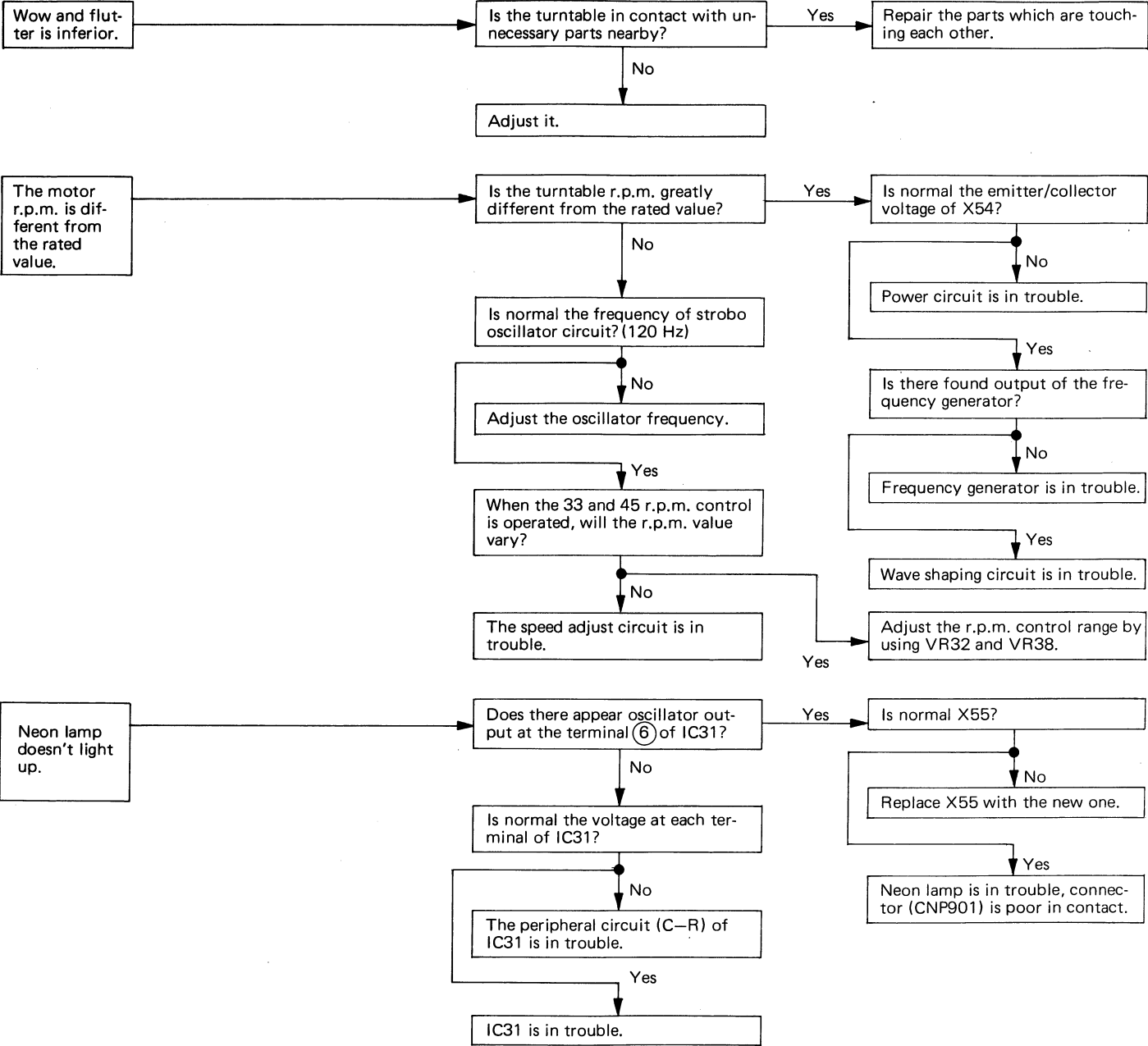
TROUBLE SHOOTING GUIDE



TROUBLE SHOOTING GUIDE



TROUBLE SHOOTING GUIDE



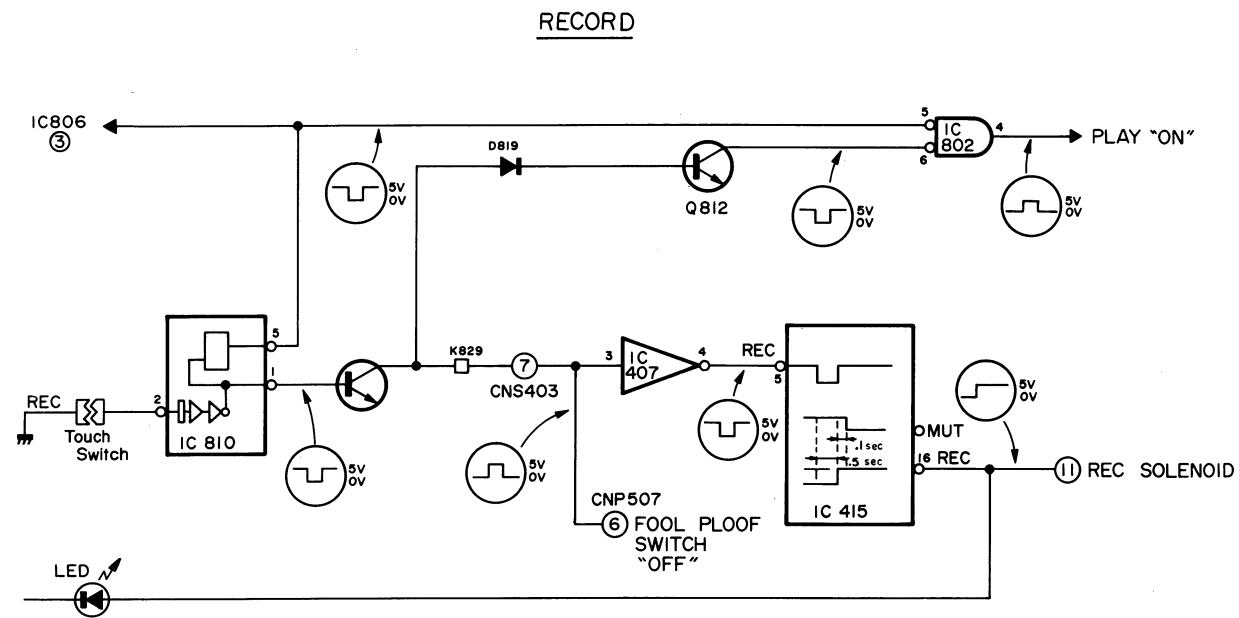


Figure 123—1 SIGNAL FLOW CHART (TAPE LOGIC: RECORD)

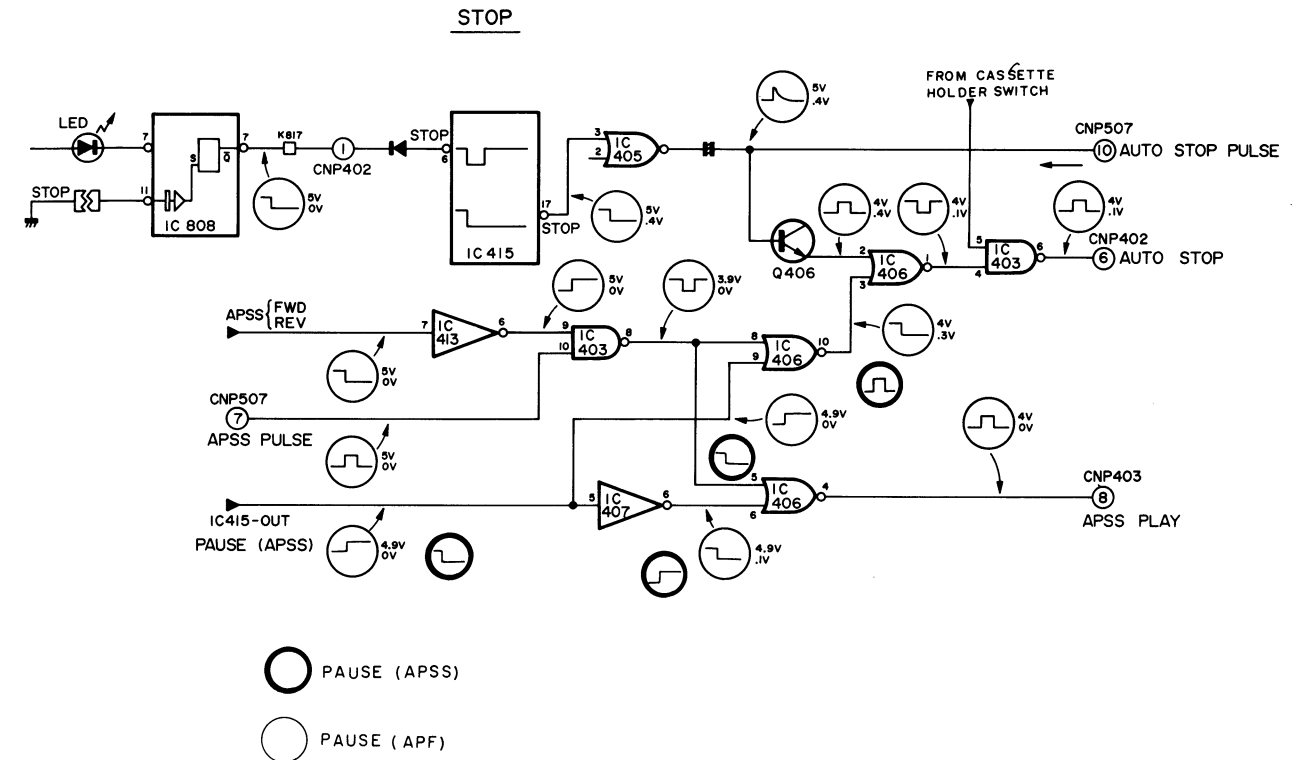


Figure 124–1 SIGNAL FLOW CHART (TAPE LOGIC: STOP)

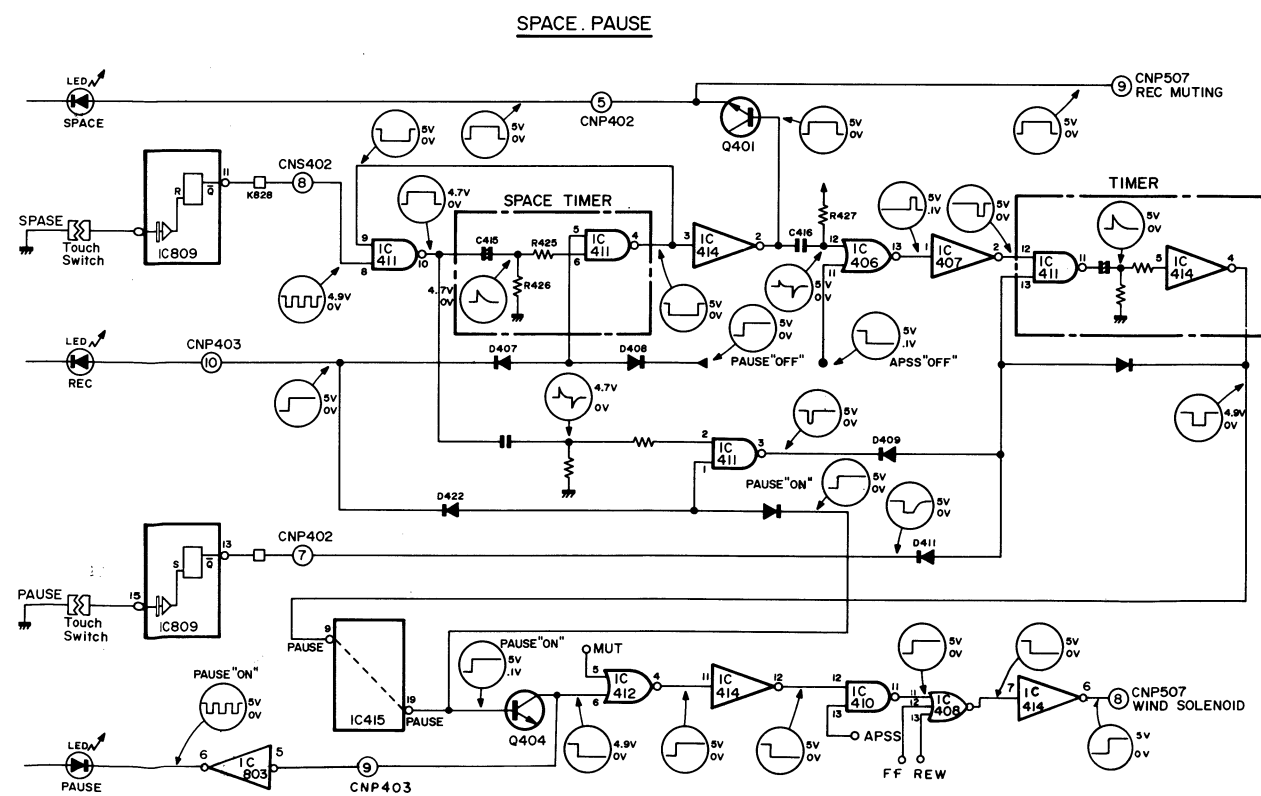


Figure 123–2 SIGNAL FLOW CHART (TAPE LOGIC: SPACE/PAUSE)

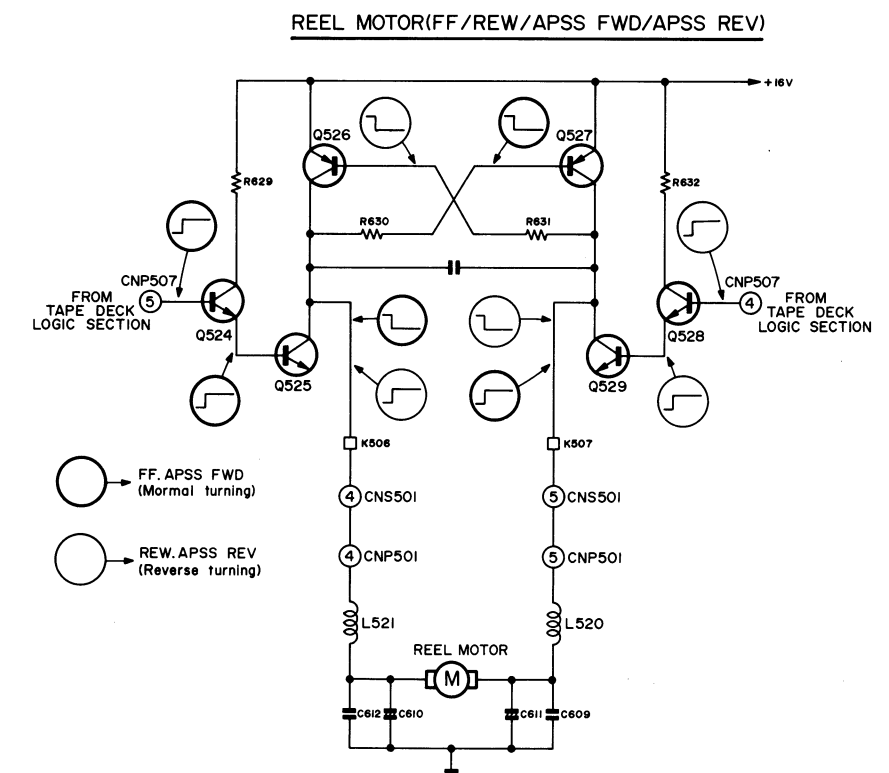


Figure 124–2 SIGNAL FLOW CHART (TAPE LOGIC: REEL MOTOR)

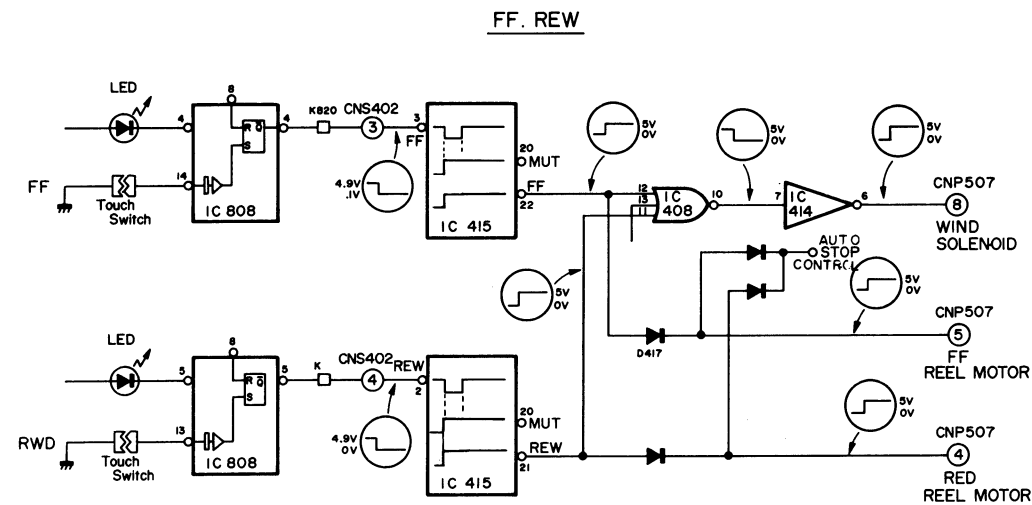
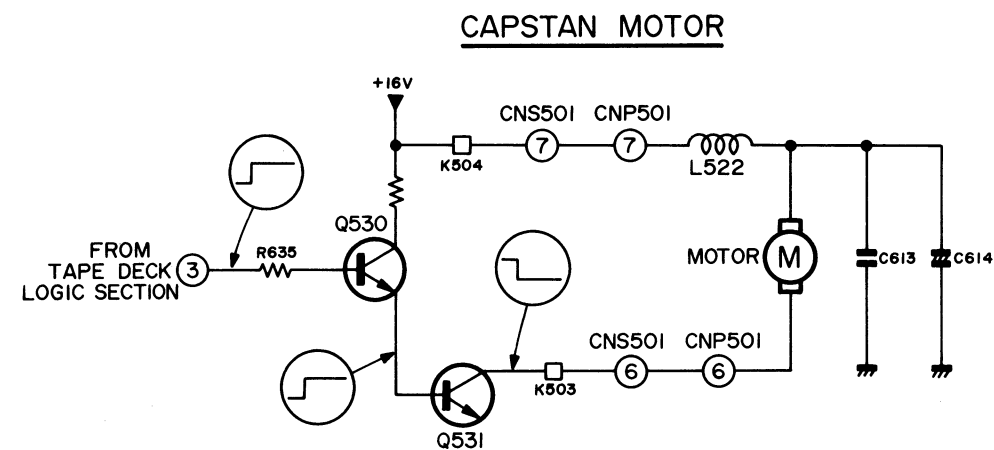


Figure 125-1 SIGNAL FLOW CHART (TAPE LOGIC: FAST FORWARD)



PLAY, PLAY/PAUSE, REC/PLAY, REC/PAUSE, REC/SPACE — MOTOR "ON"

Figure 125-2 SIGNAL FLOW CHART (TAPE LOGIC: CAPSTAN MOTOR)

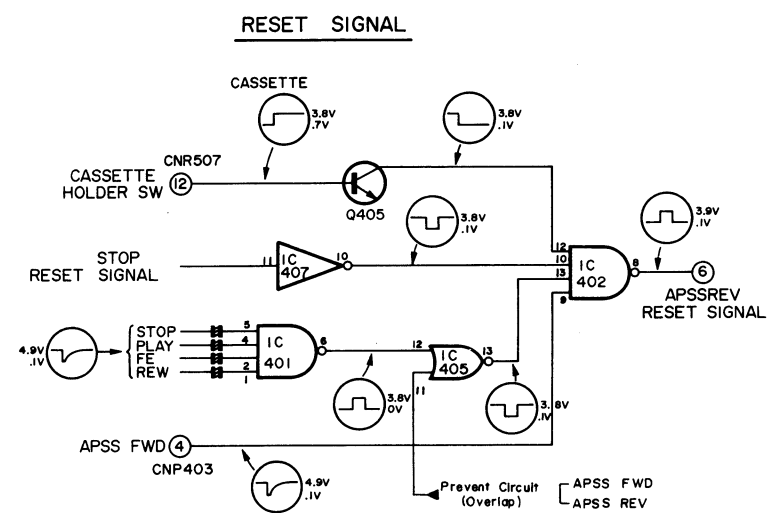


Figure 125-3 SIGNAL FLOW CHART (TAPE LOGIC: RESET)

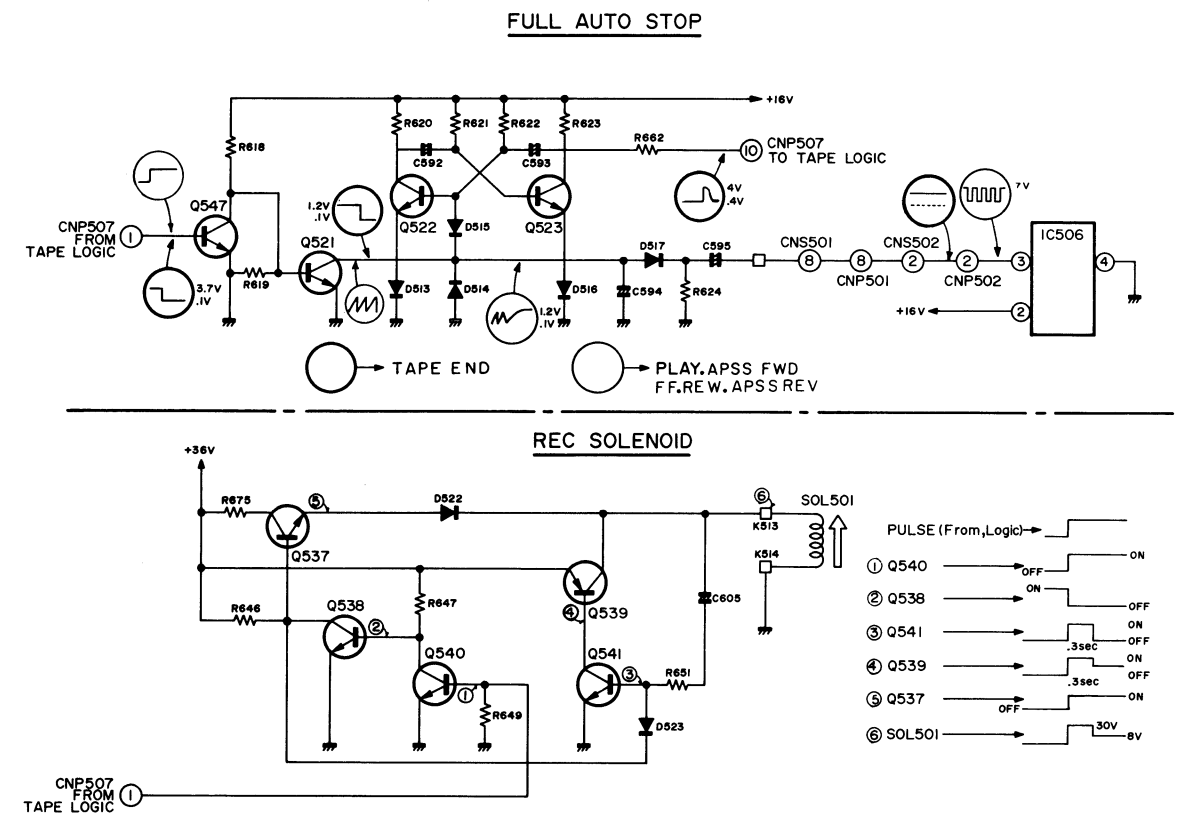


Figure 126-1 SIGNAL FLOW CHART (TAPE LOGIC: FULL AUTO STOP)

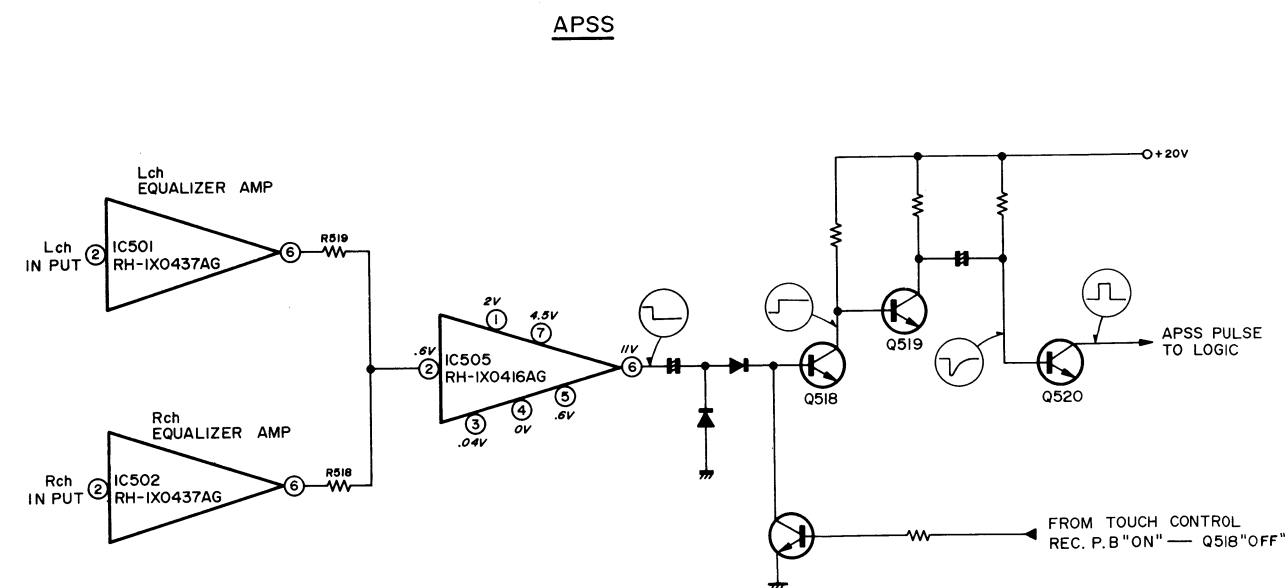


Figure 126-2 SIGNAL FLOW CHART (TAPE LOGIC: APSS)

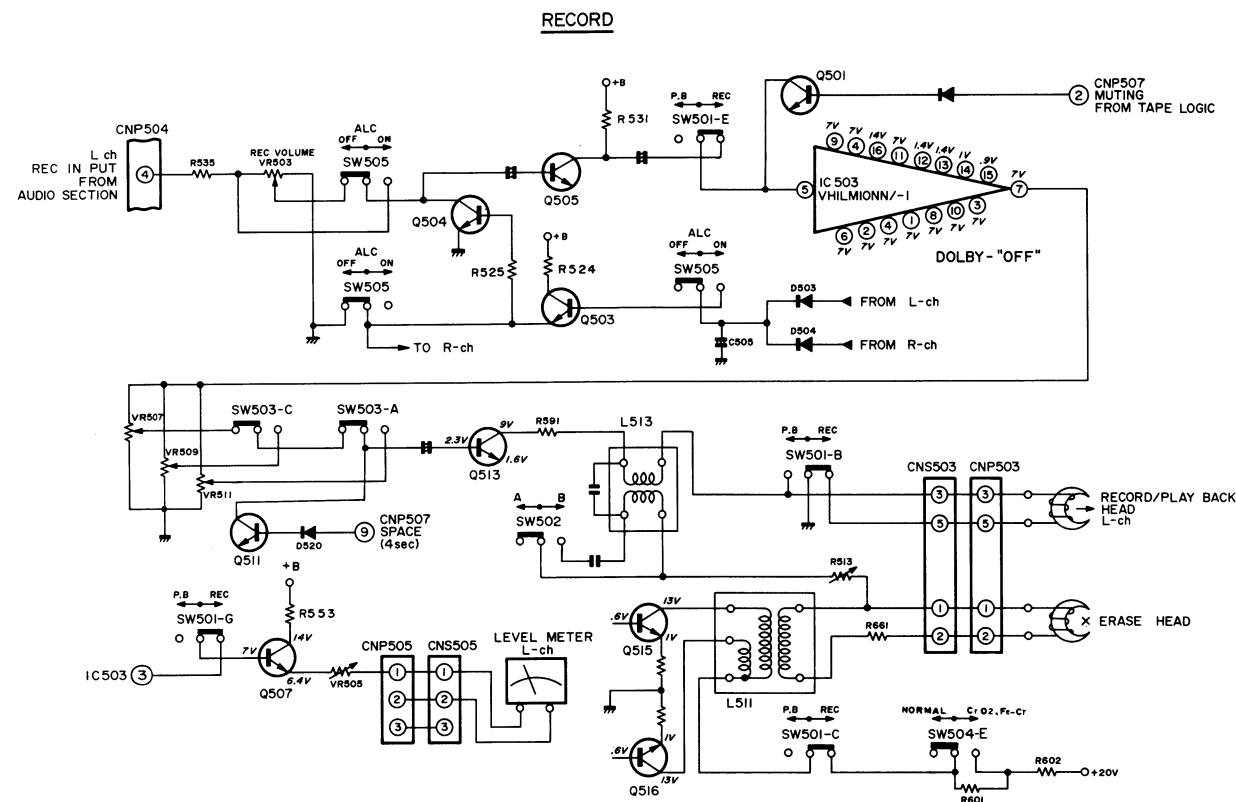


Figure 127-1 SIGNAL FLOW CHART (TAPE LOGIC: RECORD AMP.)

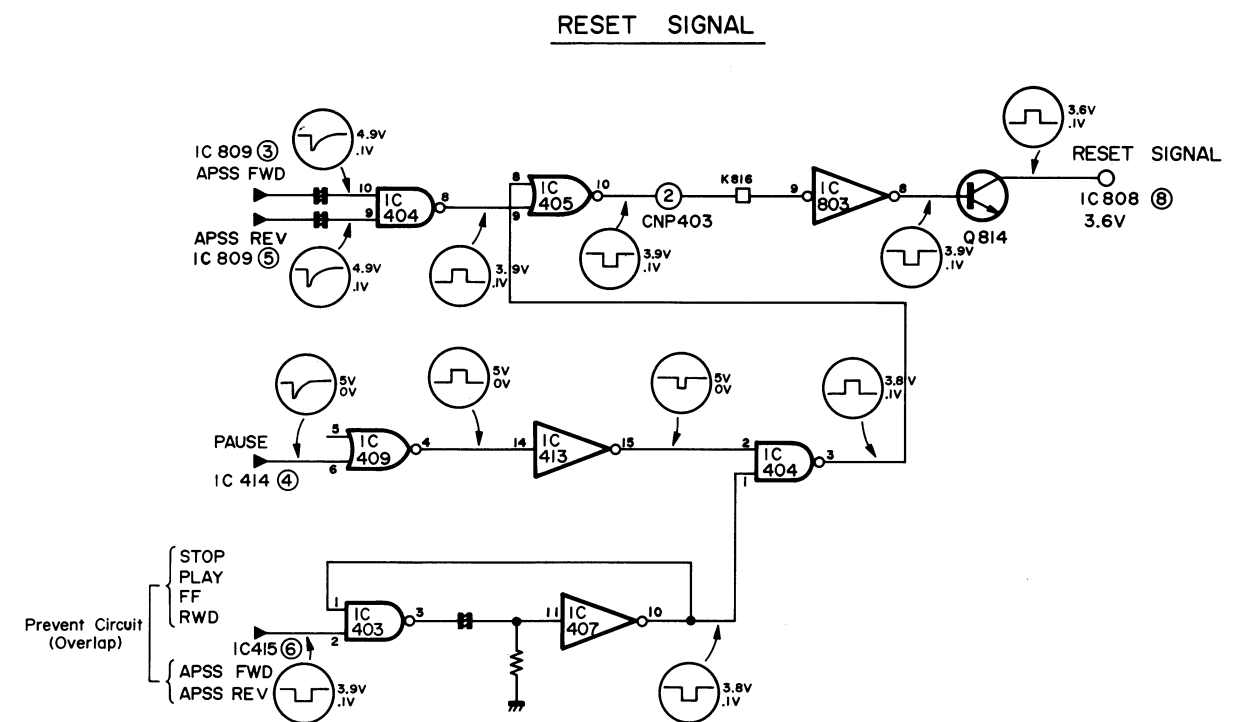


Figure 128—1 SIGNAL FLOW CHART (TAPE LOGIC: RESET)

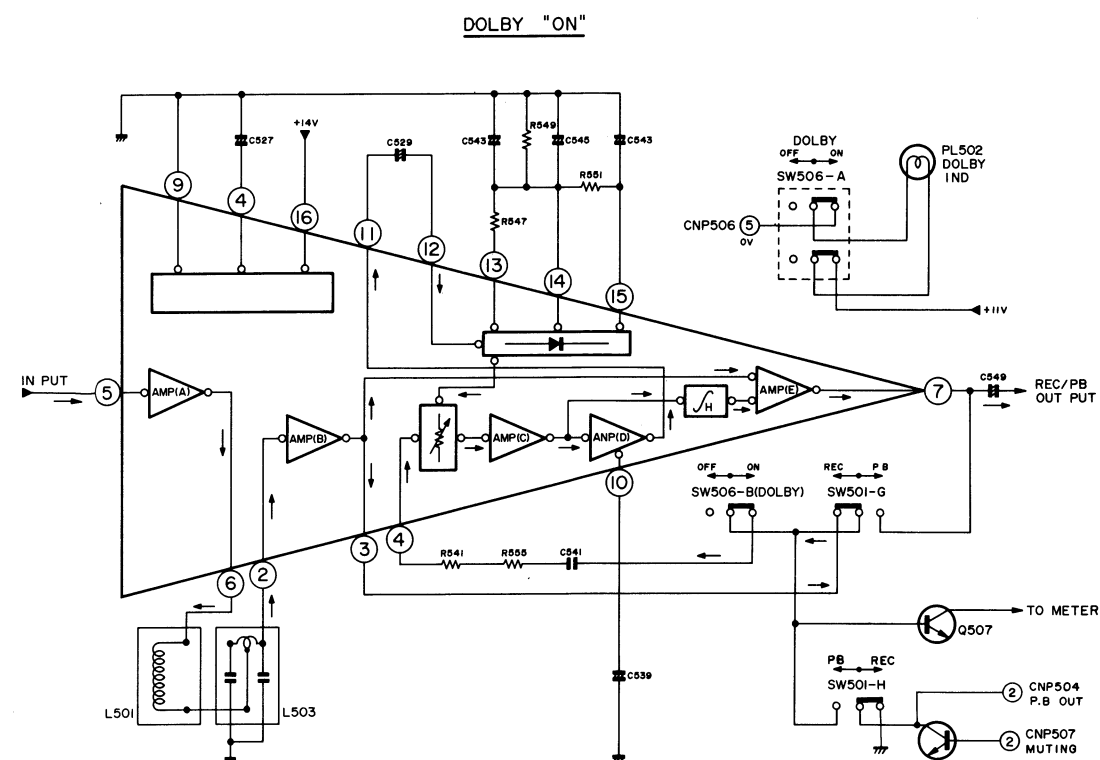


Figure 127–2 SIGNAL FLOW CHART (TAPE LOGIC: DOLBY NR)

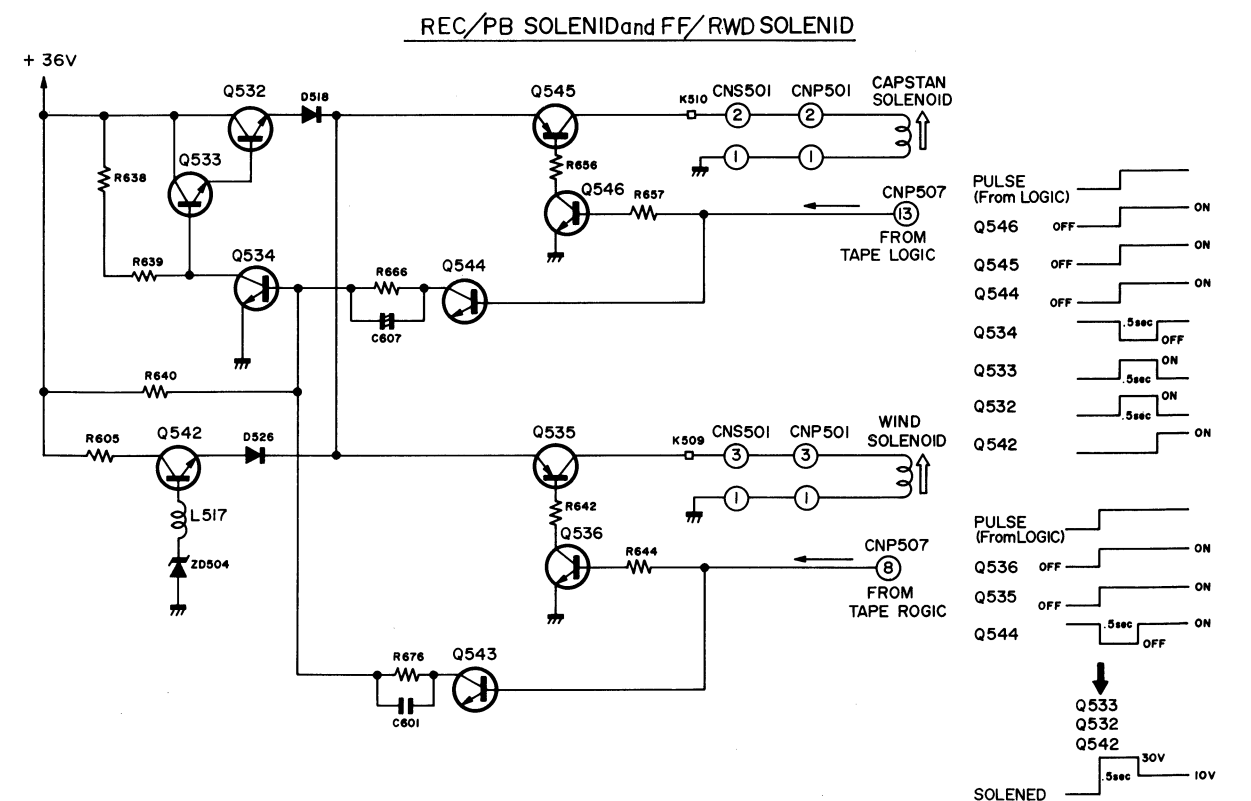


Figure 128–2 SIGNAL FLOW CHART (TAPE LOGIC: REC/PB SOLENOID-FF/RWD SOLENOID)

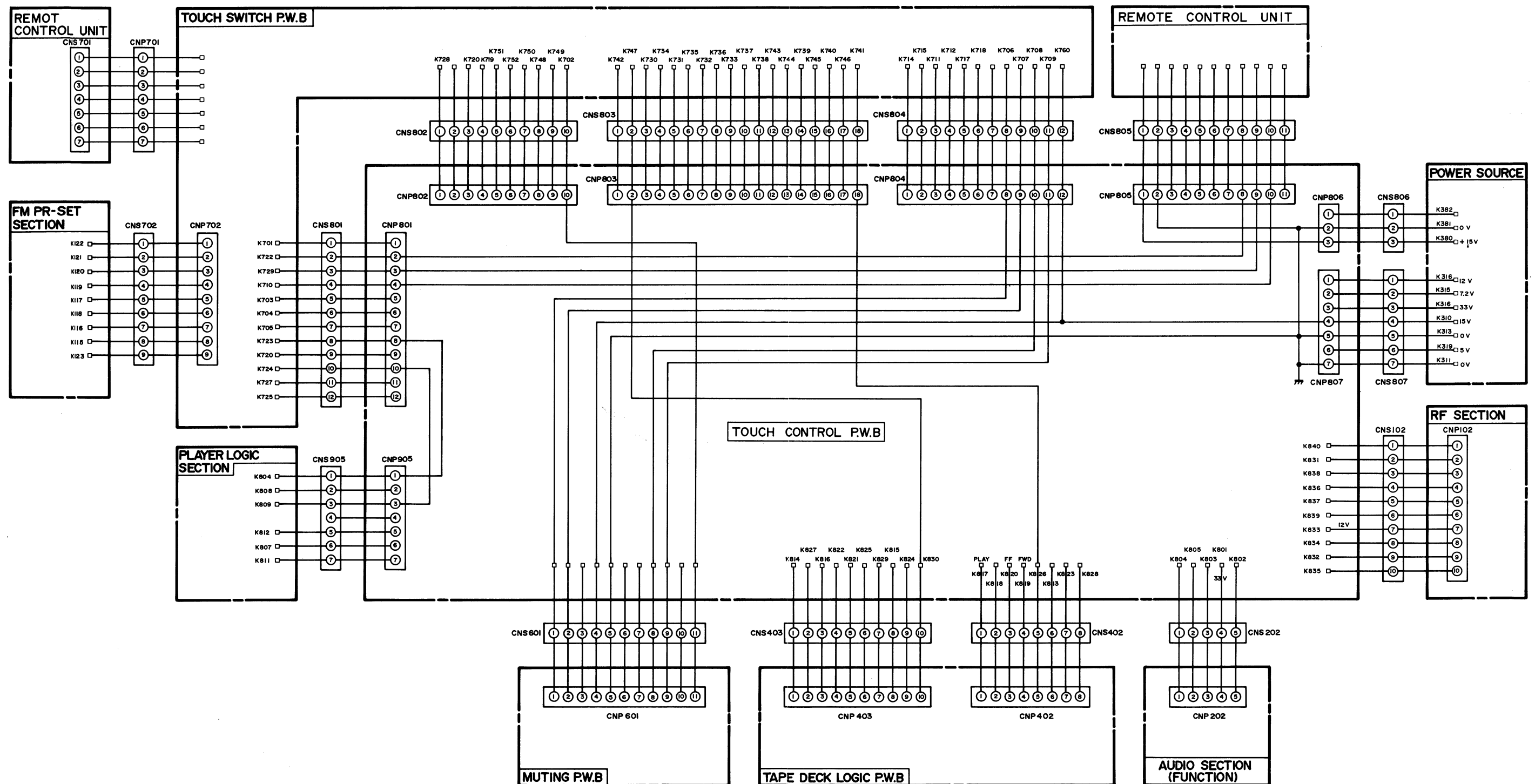


Figure 129-1 CONNECTION GUIDE

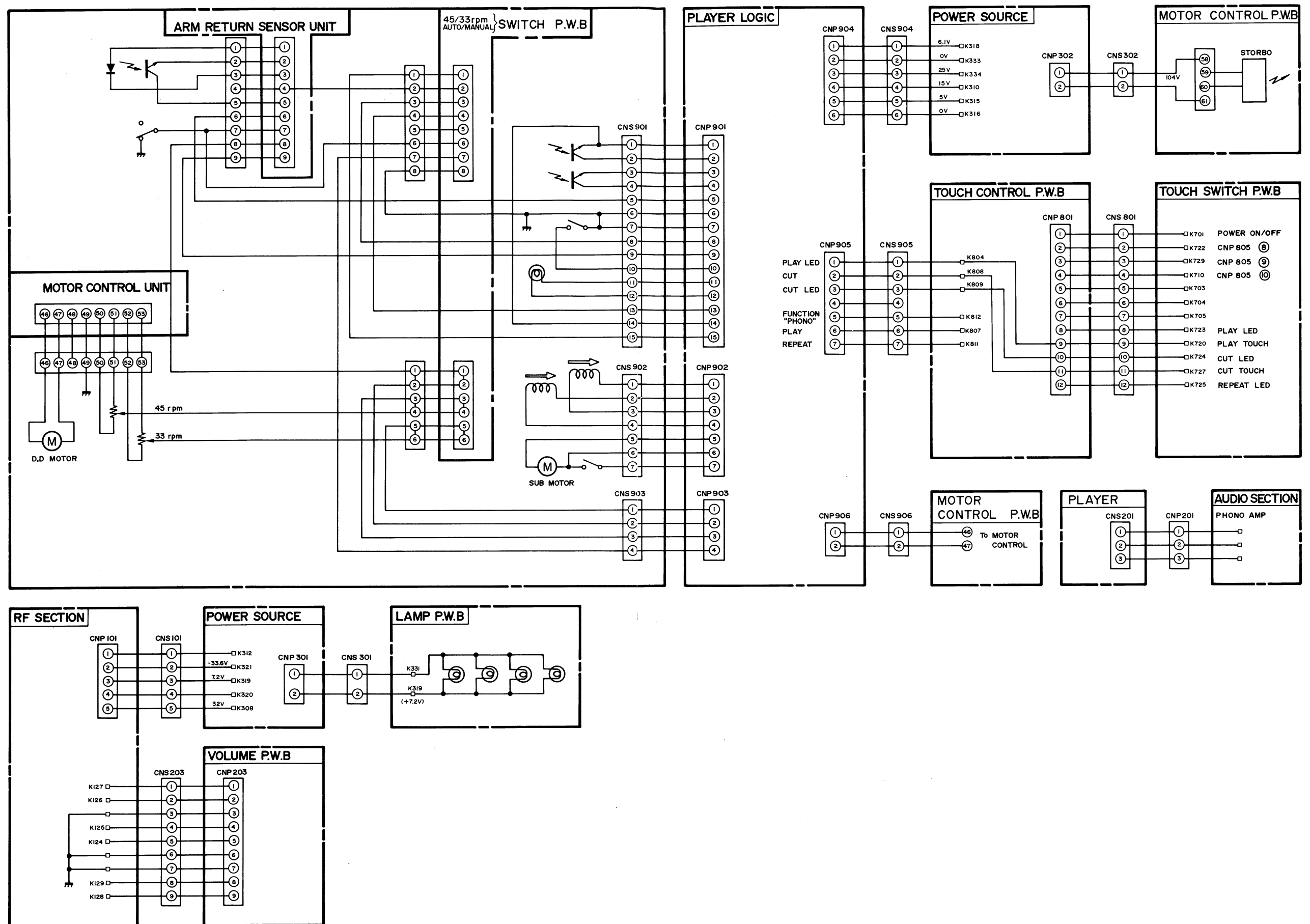


Figure 131-1 CONNECTION GUIDE

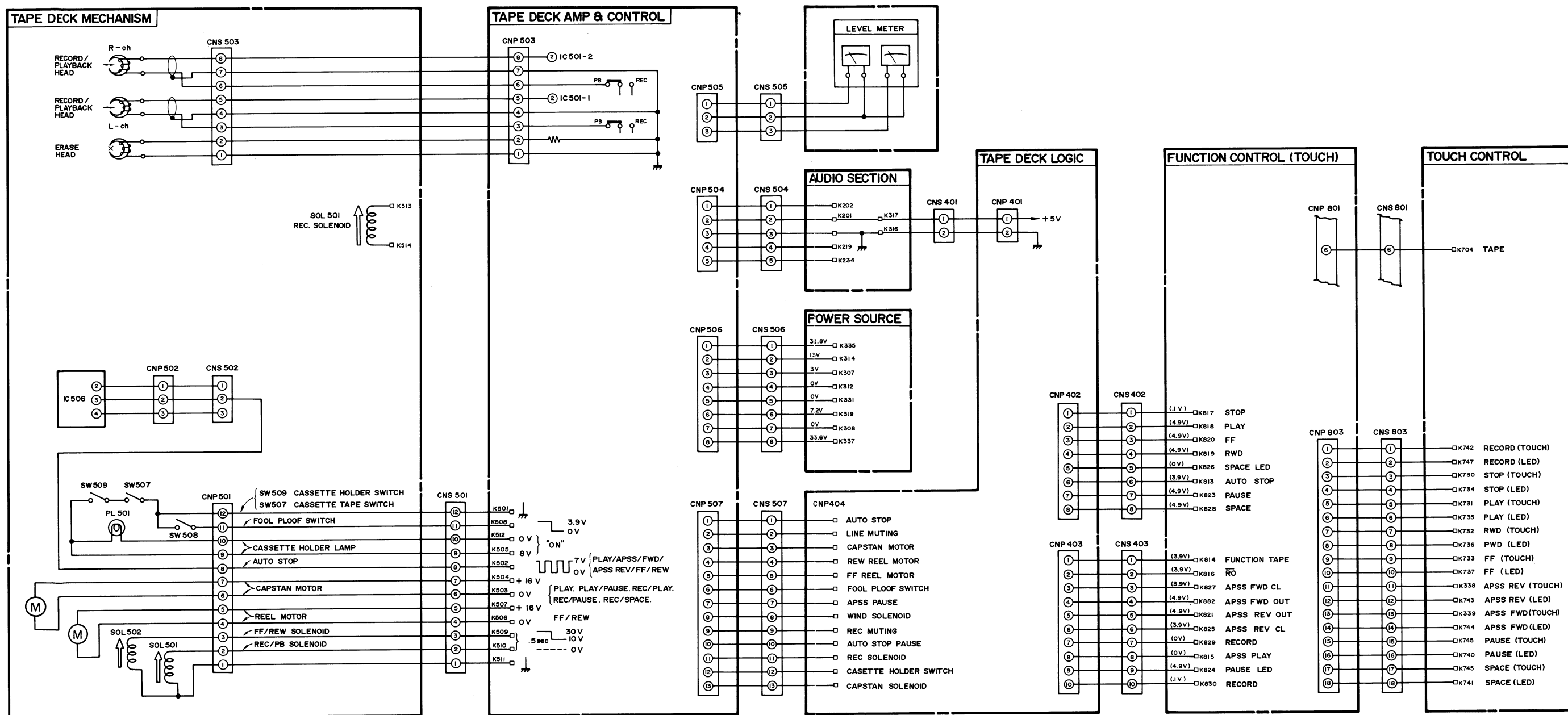


Figure 133-1 CONNECTION GUIDE

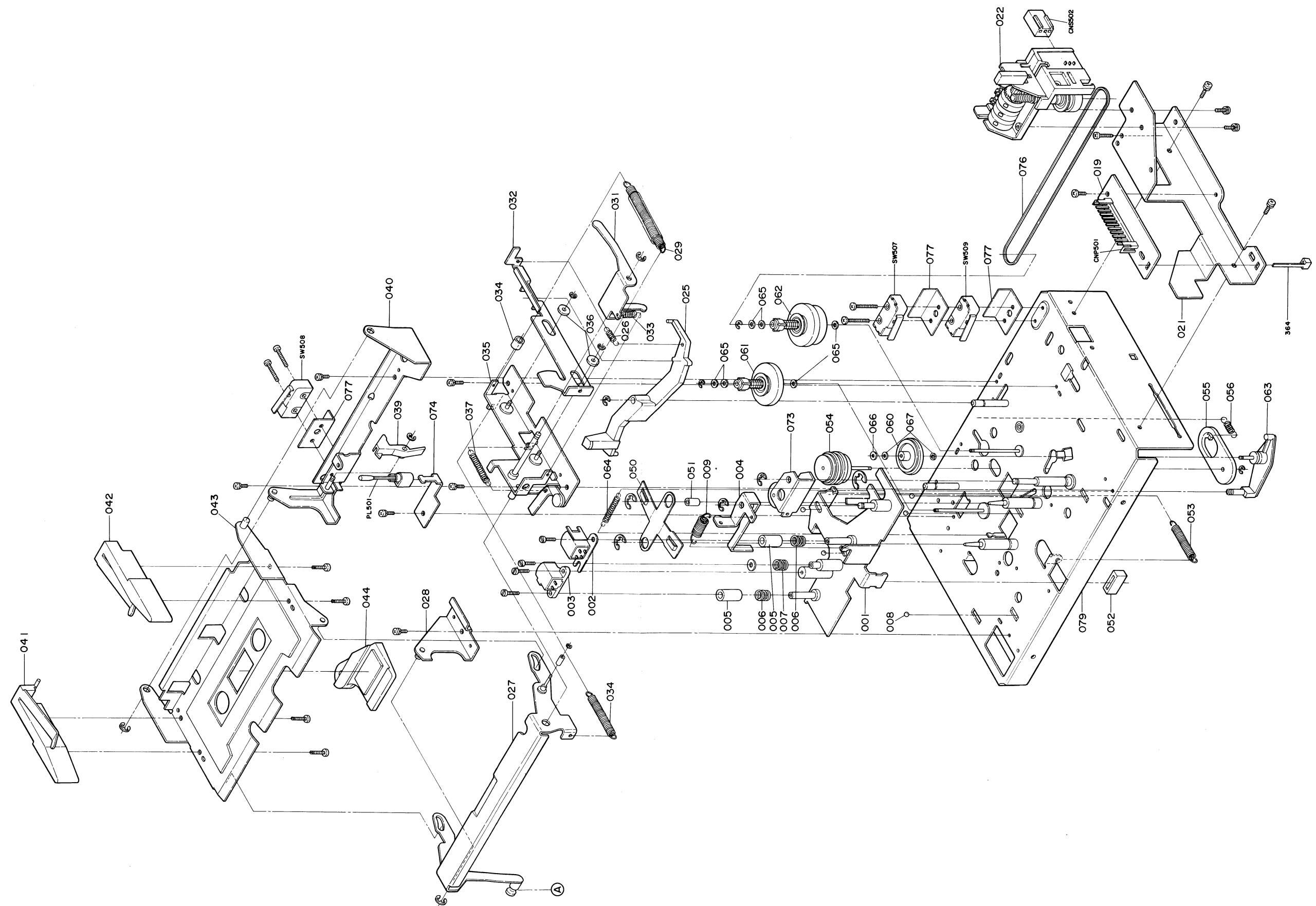


Figure 135-1 TAPE DECK MECHANISM EXPLODED TOP VIEW

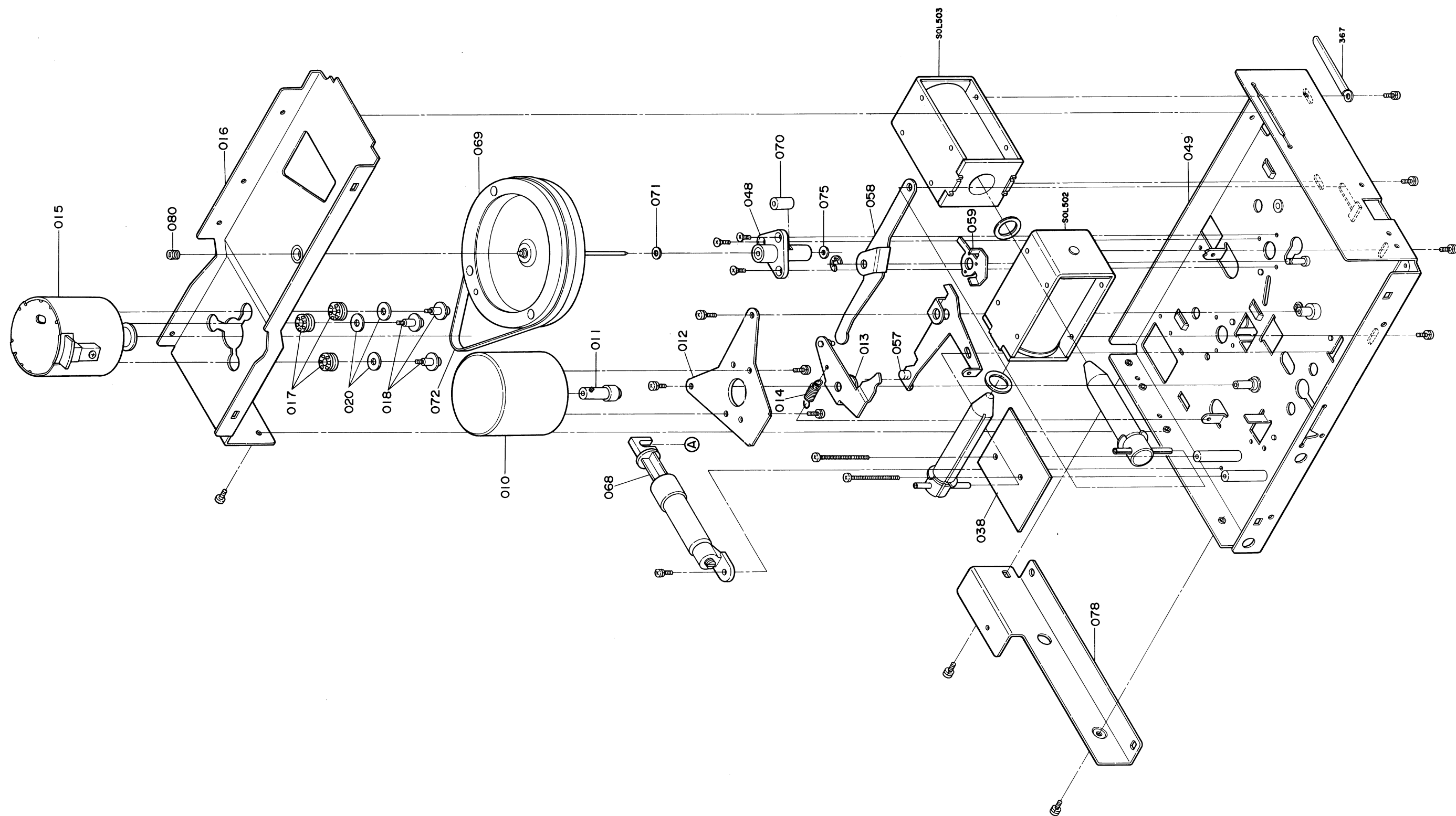


Figure 137-1 TAPE DECK MECHANISM EXPLODED BOTTOM VIEW

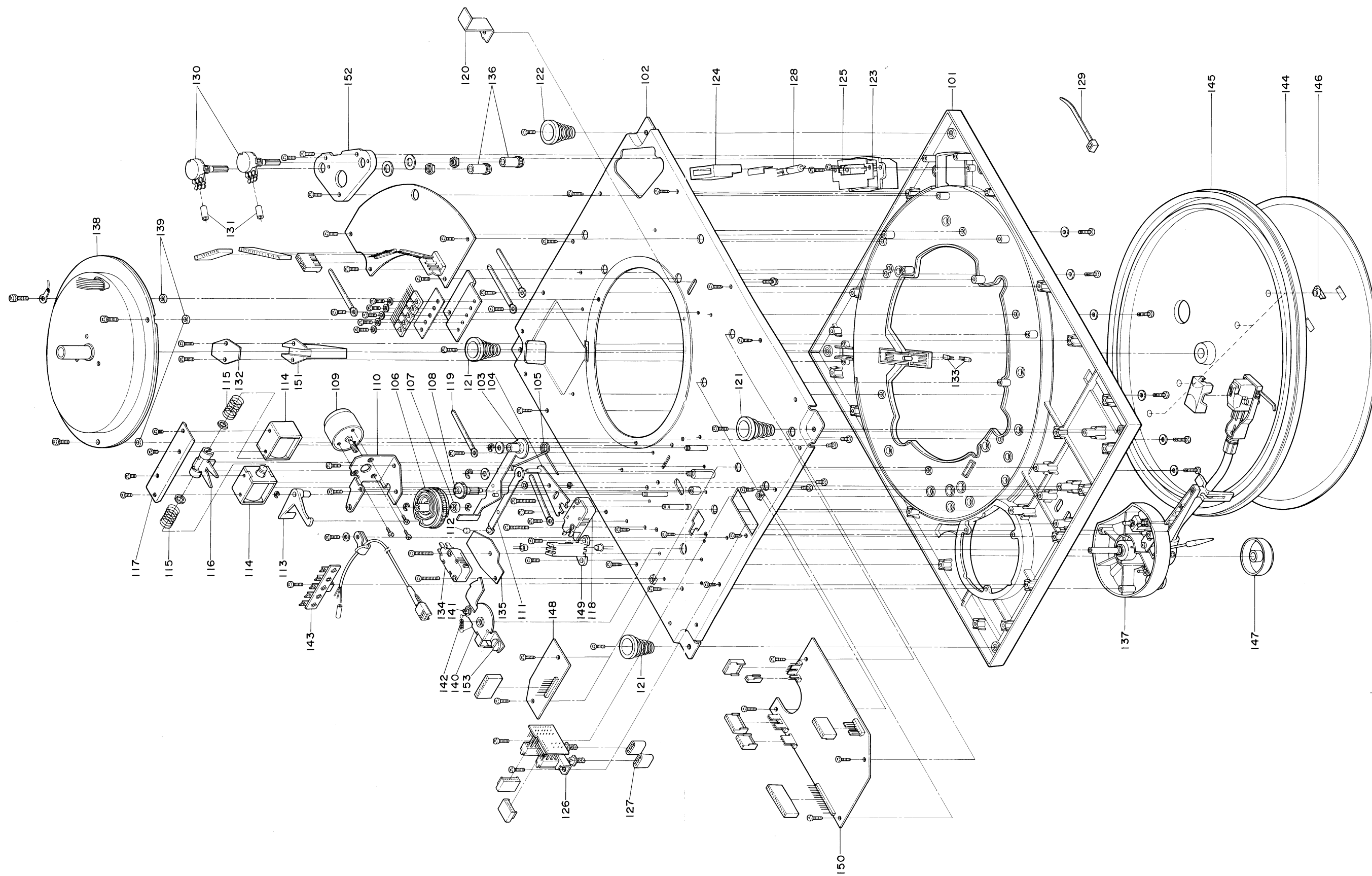


Figure 139-1 PLAYER EXPLODED VIEW

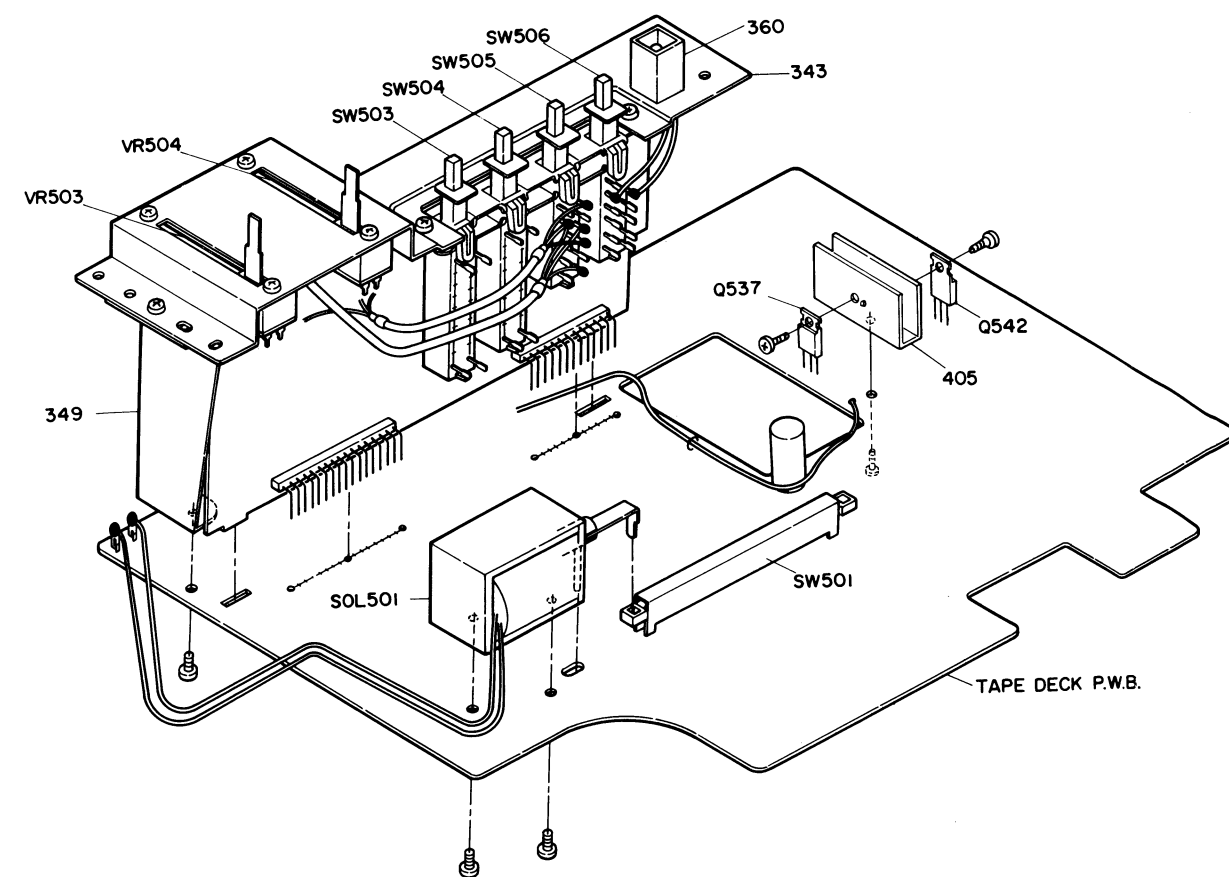
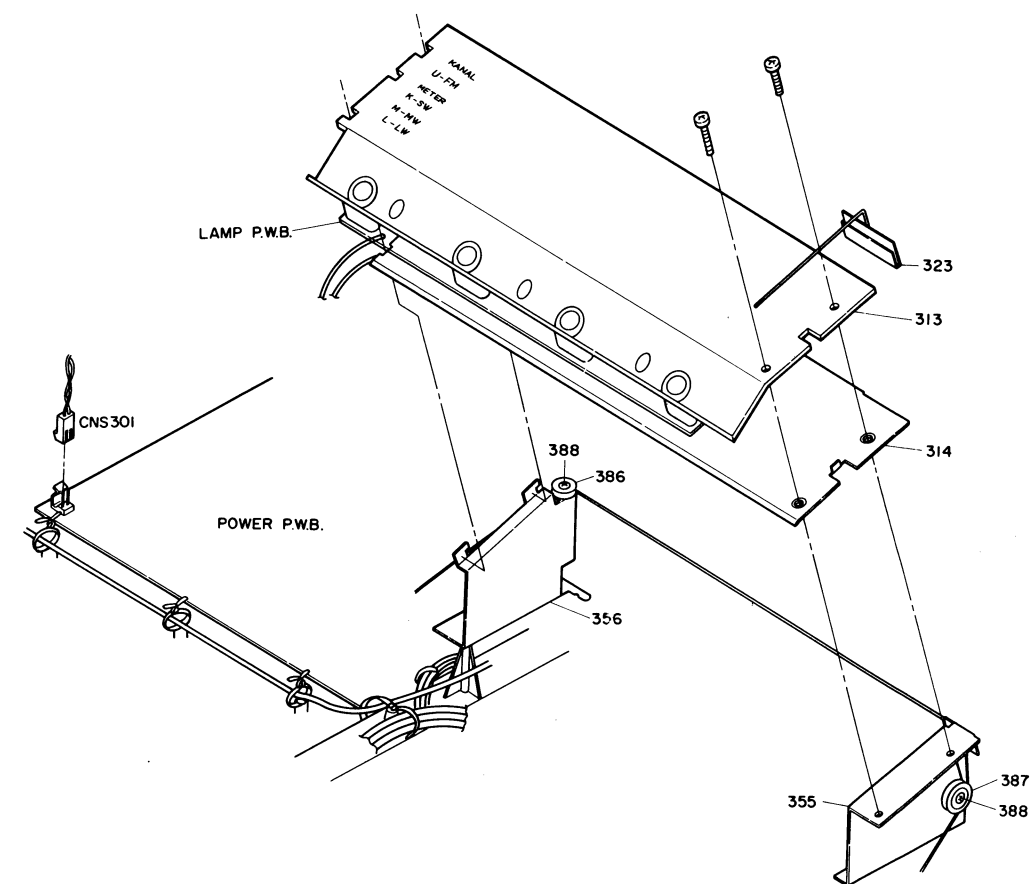
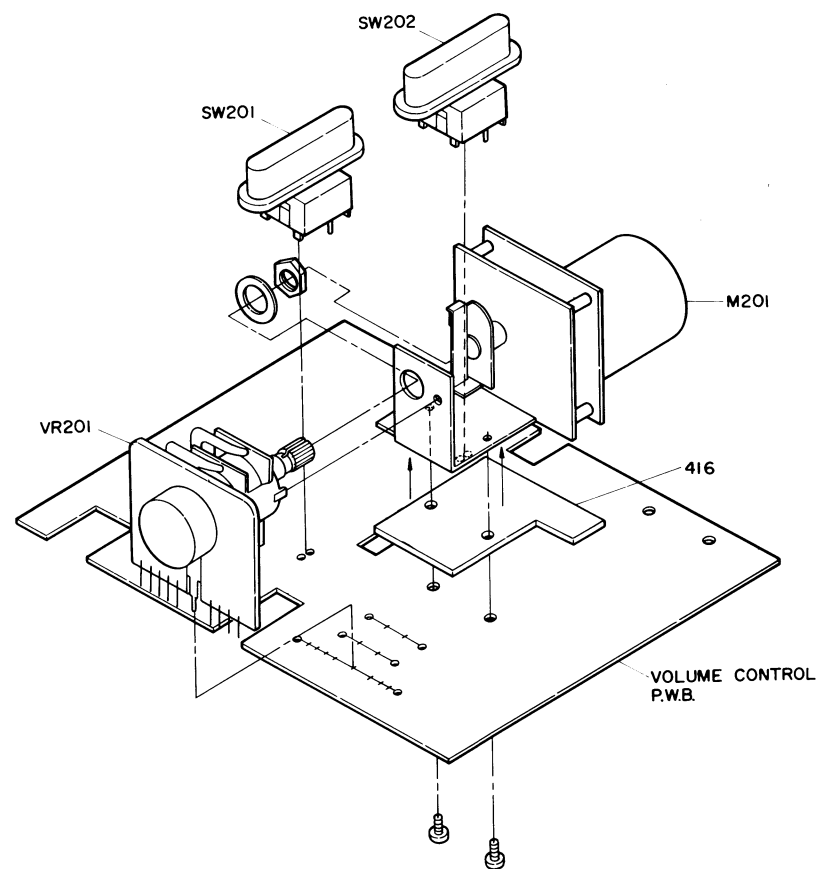
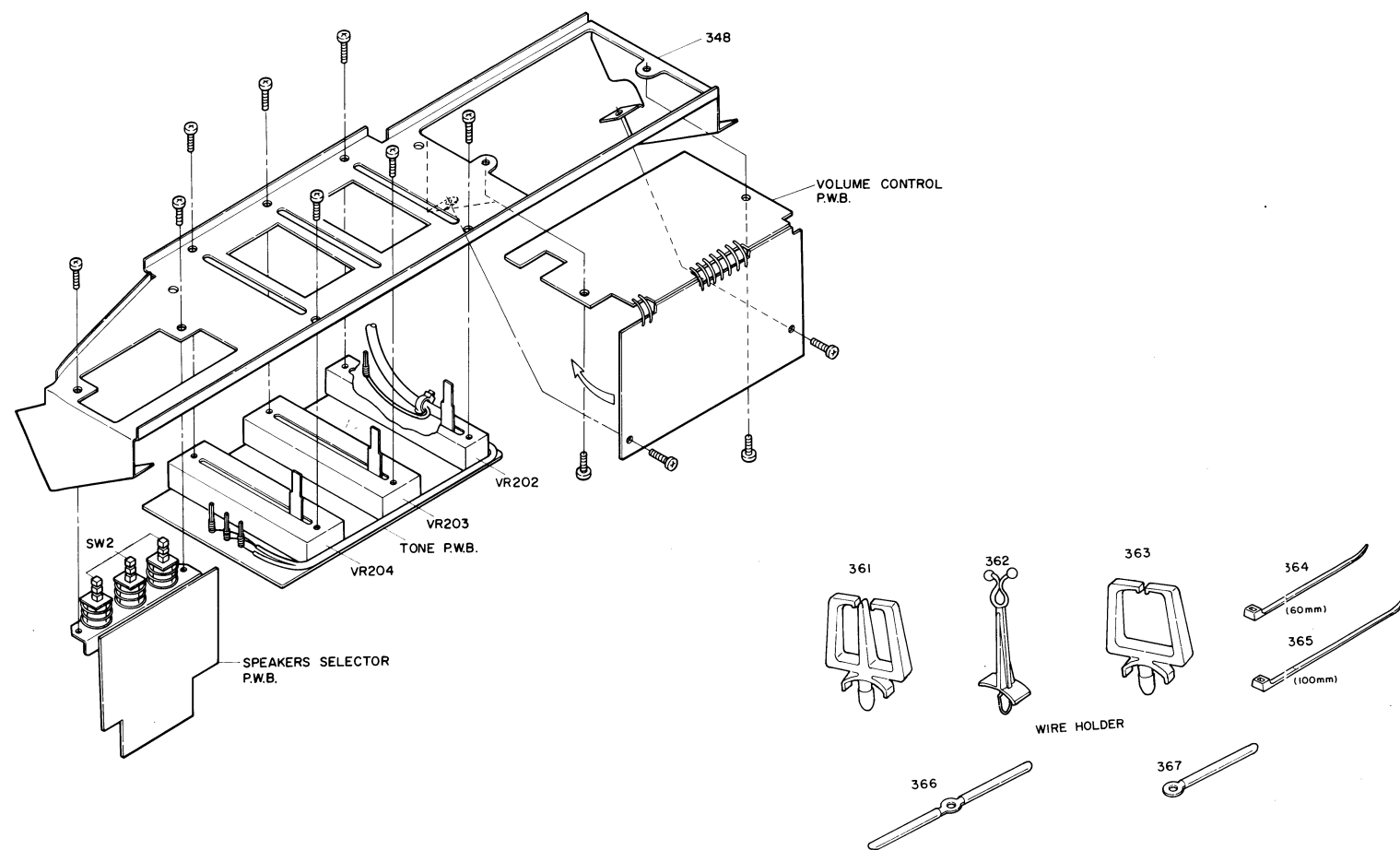


Figure 141-1 MISCELLANEOUS PARTS GUIDE

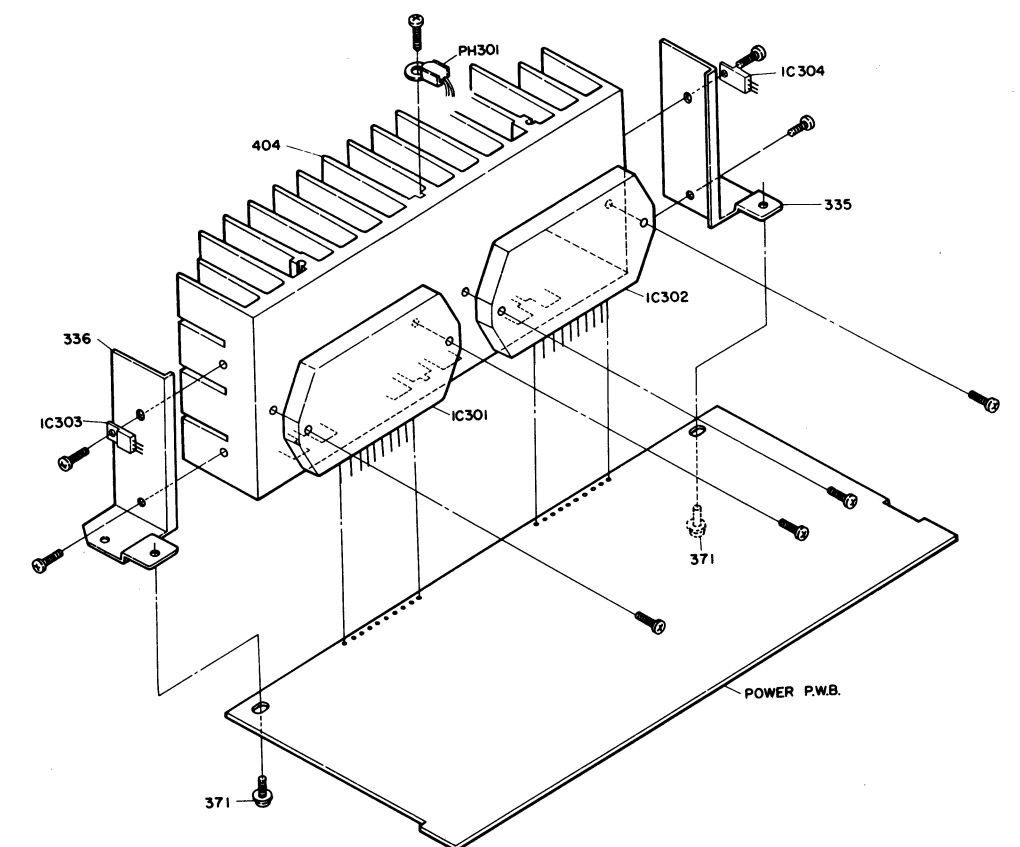
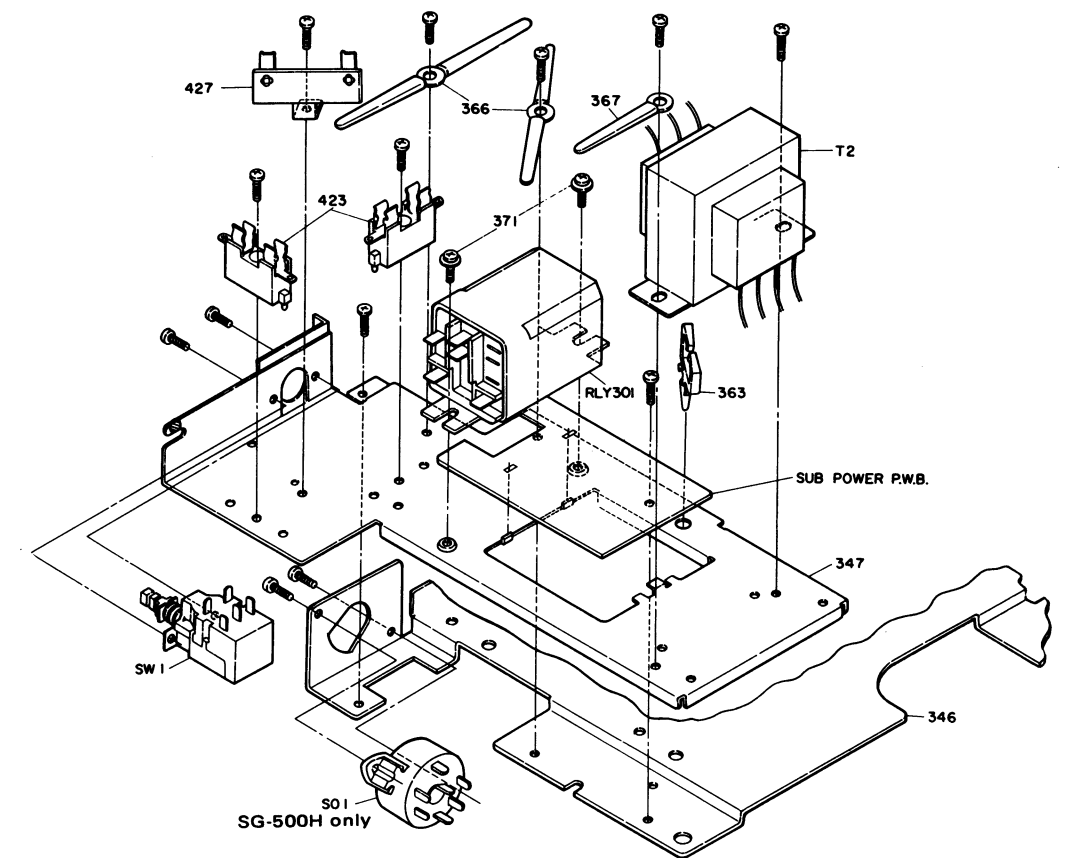
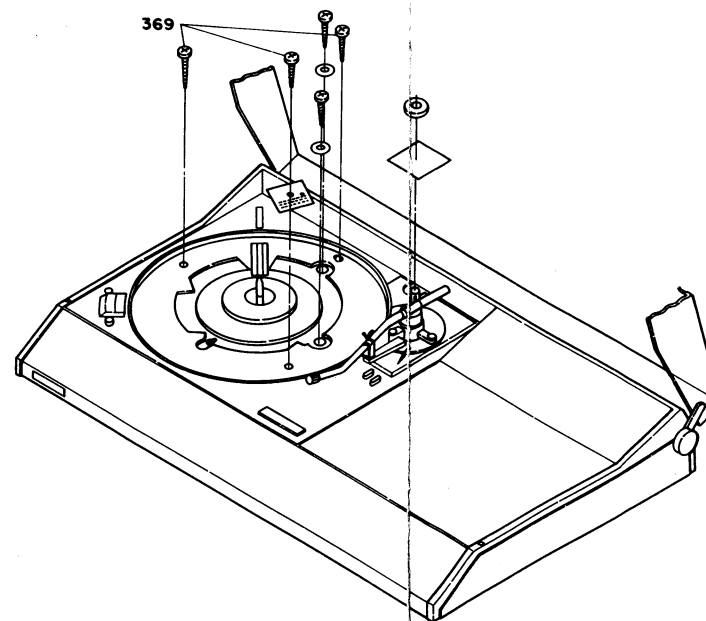
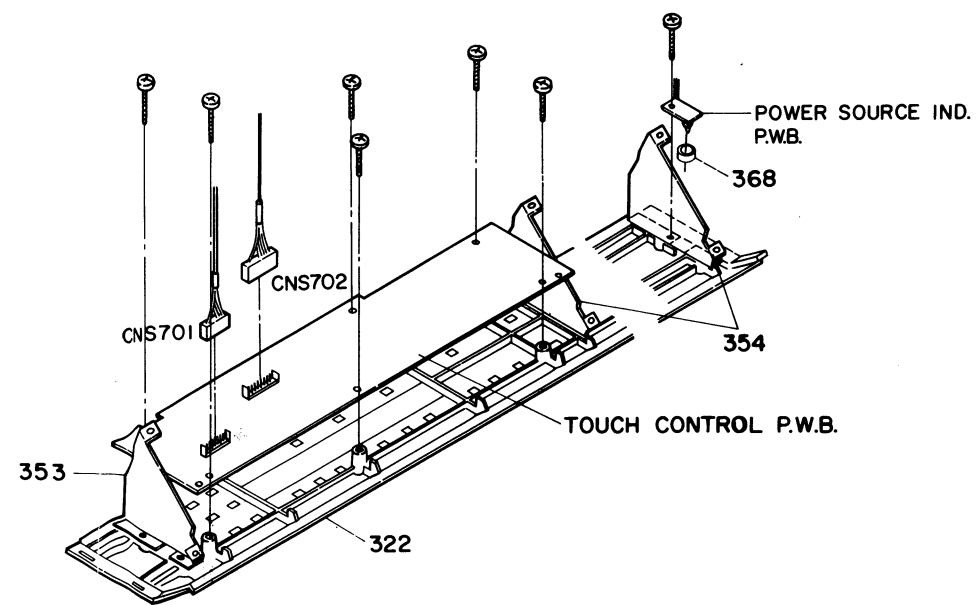
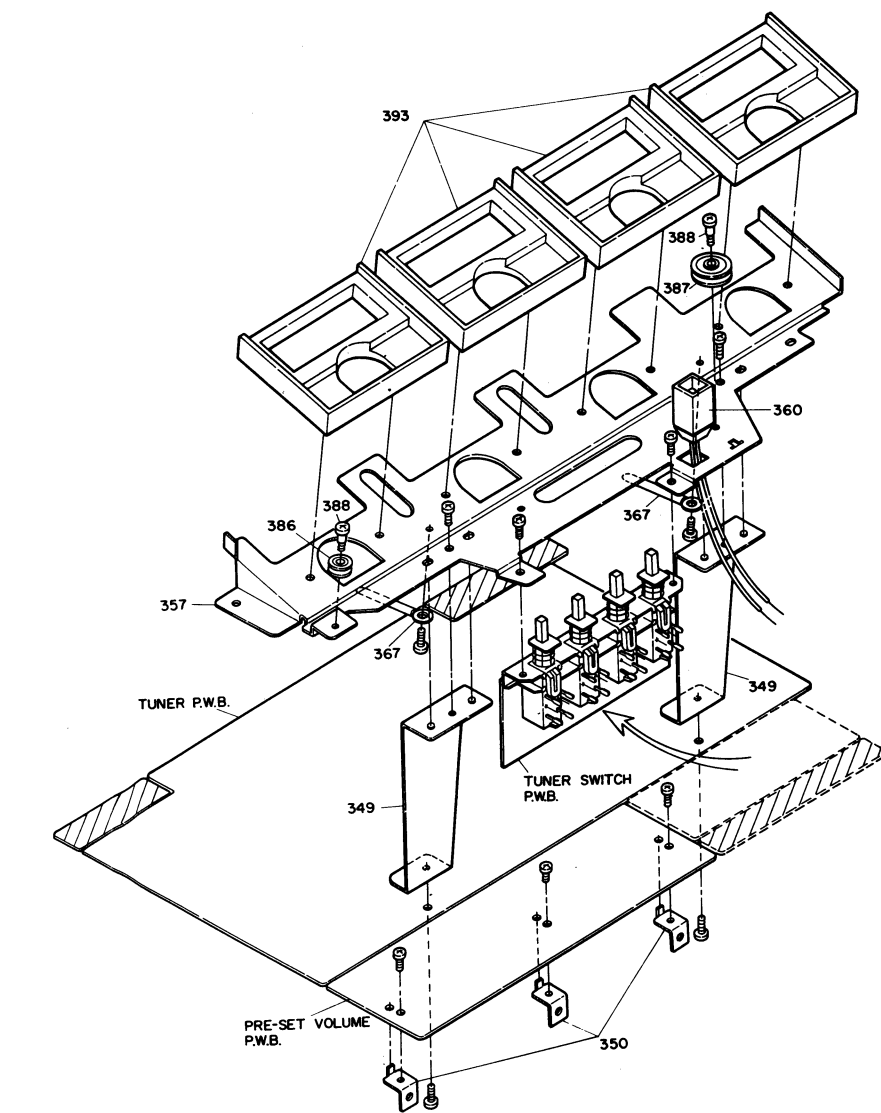


Figure 143-1 MISCELLANEOUS PARTS GUIDE

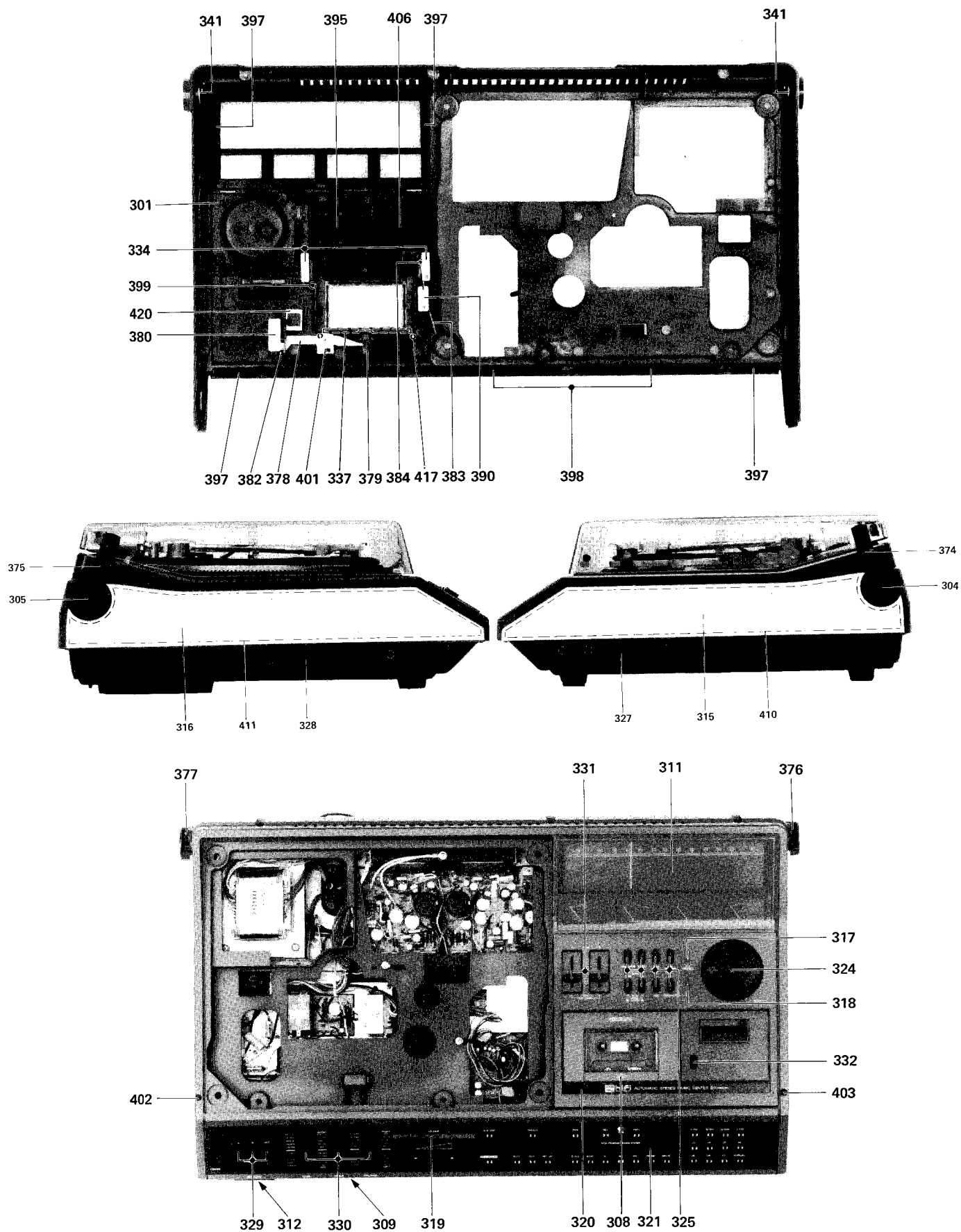


Figure 145-1 MISCELLANEOUS PARTS GUIDE

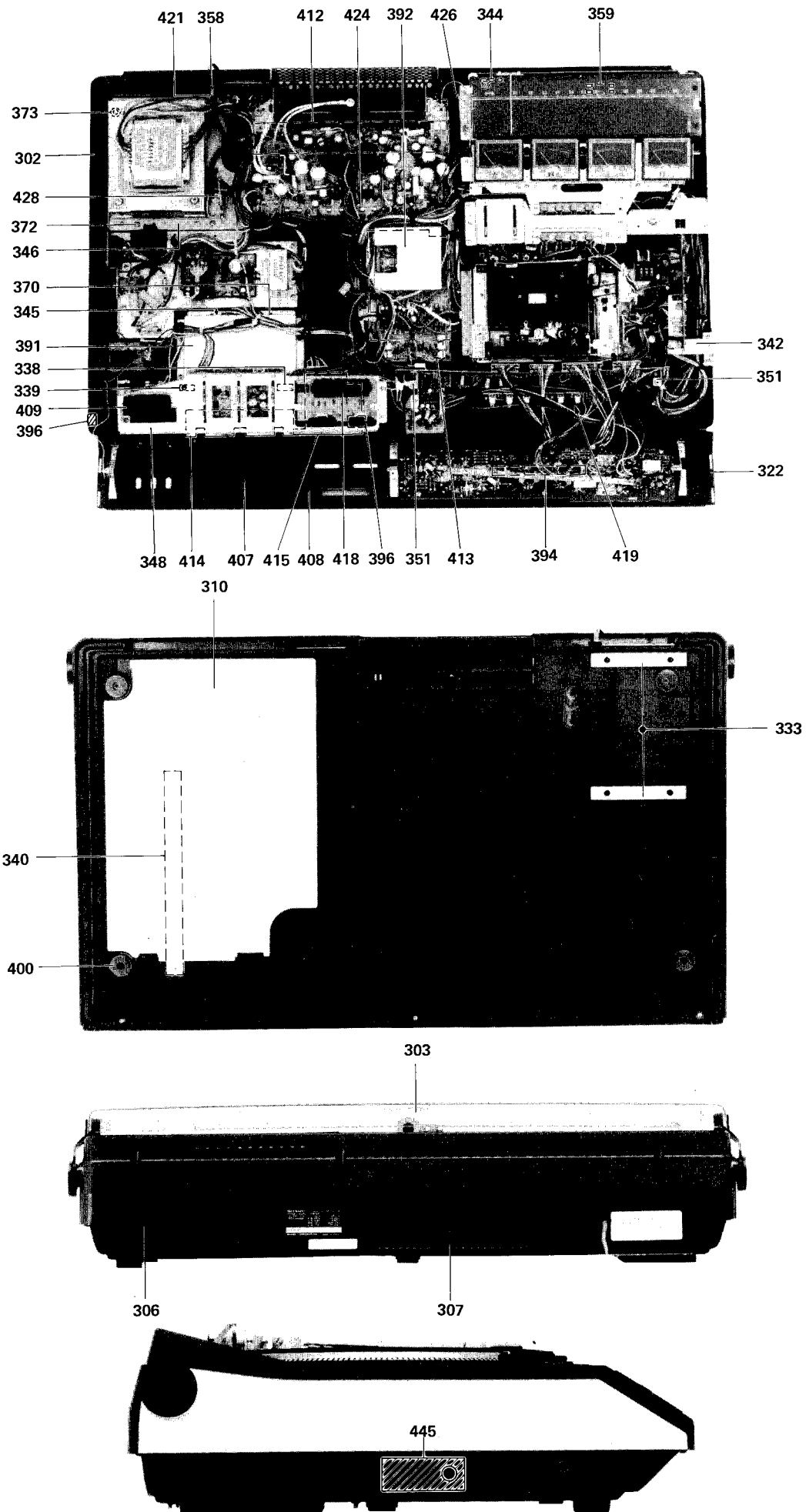


Figure 146-1 MISCELLANEOUS PARTS GUIDE

REPLACEMENT PARTS LIST

"HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following informations.

1. MODEL NUMBER
2. REF. NO.
3. PART NO.
4. DESCRIPTION

- SG-500E parts are refer to page 160 (DIFFERENCE BETWEEN SG-500H AND SG-500E)

REF. NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
INTEGRATED CIRCUITS				IC704	RH-IX1046AFZZ	Touch Sensor, FM Pre-set (HA1190)	AP
IC101	RH-IX1005AFZZ	FM IF Amp. and Detector (HA1137)	AT	IC801	RH-IX1093AFZZ	Touch Sensor, Power ON/OFF (M54621L)	AK
IC102	RH-IX1007AFZZ	FM P.L.L. MPX. Demodulator (LA3350)	AQ	IC802	RH-IX1026AFZZ	2 NOR Gate, Touch Control Section (M53202P)	AG
IC103	RH-IX1032AFZZ	AM CONV./IF/Detector (HA1151)	AK	IC803	RH-IX1094AFZZ	Hex Buffer, Touch Control Section (HD7407P)	AF
IC201, IC202, IC203, IC204, IC205, IC206	RH-IX0437AGZZ	PHONO RIAA Equalizer Amp. (TA7129P)	AH	IC804	RH-IX1027AFZZ	Hex Inverter, Touch Control Section (M53204P)	AG
	RH-IX0437AGZZ	Mic. Pre-amp. (TA7129P)	AH	IC805	RH-IX1026AFZZ	2 NOR Gate, Touch Control Section (M53202P)	AG
	RH-IX0437AGZZ	Tone Control Amp. (TA7129P)	AH	IC806	RH-IX1092AFZZ	Touch Sensor, PHONO/PLAY CUT (M54620P)	AQ
IC301, IC302	RH-IX1089AFZZ	Power Amp. (STK-082)	BA	IC807	RH-IX1093AFZZ	Touch Sensor, PHONO REPEAT (M54621L)	AK
IC303, IC304	RH-IX1103AFZZ	DC 5V Fixed Voltage Regulator (TA78005P)	AK	IC808	RH-IX1091AFZZ	Touch Sensor, TAPE STOP/PLAY/RWD/FF (M51232P)	AQ
IC305	RH-IX1048AFZZ	33V Zener (μ PC574J)	AH	IC809	RH-IX1092AFZZ	Touch Sensor, TAPE REV APSS/FWD APSS/PAUSE/SPACE (M54620P)	AQ
IC381	RH-IX1104AFZZ	DC 15V Fixed Voltage Regulator (TA78015P)	AK	IC810	RH-IX1093AFZZ	Touch Sensor, TAPE REC	AK
IC401, IC402	RH-IX1096AFZZ	4 NAND Gate, Tape Logic Section (HD7420)	AF	IC901	RH-IX1100AFZZ	2 NOR Gate, Player Logic Section (TC4001)	AF
IC403, IC404	RH-IX1025AFZZ	2 NAND Gate, Tape Logic Section (HD7400)	AG	IC902	91ZSN7400	2 NAND Gate, Player Logic Section (SN7400)	AH
IC405, IC406	RH-IX1026AFZZ	2 NOR Gate, Tape Logic Section (HD7402)	AG	IC903	91ZSN7404	Hex Inverter, Player Logic Section (SN7404)	AH
IC407	RH-IX1027AFZZ	Hex Inverter, Tape Logic Section (HD7404)	AG	IC905	91ZSN7400	2 NAND Gate, Player Logic Section (SN7400)	AH
IC408	RH-IX1102AFZZ	3 NOR Gate, Tape Logic Section (TC4025P)	AF	IC906	RH-IX1097AFZZ	2 NAND Gate, Player Logic Section (SN7408)	AH
IC409	RH-IX1100AFZZ	2 NOR Gate, Tape Logic Section (TC4001P)	AF	IC907, IC908	91ZSN7402	2 NOR Gate, Player Logic Section (SN7402)	AH
IC410, IC411	RH-IX1099AFZZ	2 NAND Gate, Tape Logic Section (TC4011P)	AF	IC909	RH-IX1097AFZZ	2 AND Gate, Player Logic Section (SN7408)	AH
IC412	RH-IX1100AFZZ	2 NOR Gate, Tape Logic Section (TC4001P)	AF	IC910	91ZSN7402	2 NOR Gate, Player Logic Section (SN7402)	AH
IC413, IC414	RH-IX1098AFZZ	Hex Inverter, Tape Logic Section (TC4049)	AK	IC911	91ZSN7400	2 NAND Gate, Player Logic Section (SN7400)	AH
IC415	RH-IX1090AFZZ	LSI, Tape Control (TC9121P)	AX	IC912	91ZSN7433	2 NOR Buffer, Player Logic Section (SN7433)	AK
IC501, IC502	RH-IX0437AGZZ	Playback Equalizer Amp. (TA7129P)	AH	IC913	91ZSN7404	Hex Inverter, Player Logic Section (SN7404)	AH
IC503, IC504	VHILM1011N/-1	Dolby NR Processor (LM1011N)	AR	IC914	RH-IX1097AFZZ	2 AND Gate, Player Logic Section (SN7408)	AH
IC505	RH-IX0416AGZZ	APSS Limiter Amp. (BA301)	AH	IC1001	91Z μ PC151A	Arm Return Sensor (μ PC151A) (IC1)	AQ
IC601	RH-IX1099AFZZ	FM/SW/MW/LW Muting Control (TC4011P)	AF	IC1101	91Z μ PC151A	OP. Amp. (μ PC151A) (IC31)	AQ
IC602	RH-IX1098AFZZ	FM/SW/MW/LW Muting Control (TC4049P)	AK	TRANSISTORS			
IC701	RH-IX1091AFZZ	Touch Sensor, PHONO/TAPE/MIC/AUX (M51232P)	AQ	Q101	VS2SC460-B/-1	FM IF Amp. (2SC460B)	AC
IC702	RH-IX1091AFZZ	Touch Sensor, FM/SW/MW/LW (M51232P)	AQ				
IC703	VHIHA1194//1F	Touch Sensor, FM Pre-set (HA1194)	AS				

** : Price will be quoted upon receipt of order.

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
Q102	VS2SC458-B/-1	FM Muting (2SC458B)	AC	Q529	VS2SC1162WC-1	Reel Motor Drive (2SC1162WC)	AF
Q104	VS2SA673-C/-1	Stereo Indicator Drive (2SA673C)	AE	Q530	VS2SC1815GR-1	Capstan Motor Drive (2SC1815GR)	AC
Q105	VS2SC461-C/-1	AM Local Oscillator (2SC461C)	AC	Q531	VS2SC1214-C-1	Capstan Motor Drive (2SC1214C)	AD
Q106	VS2SC458AC/-1	FM Pre-set Meter Drive (2SC458AC)	AC	Q532	VS2SD235-Y/-1	REC/PB and FF/RWD Solenoid Drive (2SD235Y)	AG
Q107, Q108, Q201, Q202	VS2SC1815GR-1	Output Level Transducer (2SC1815GR)	AC	Q533, Q534	VS2SC1815GR-1	REC/PB and FF/RWD Solenoid Drive (2SC1815GR)	AC
Q203, Q204	VS2SA673-B/-1	Volume Control Motor Drive (2SA673B)	AD	Q535	VS2SA755-C/-1	FF/RWD Solenoid Drive (2SA755C)	AH
Q205, Q206	VS2SC1213-B-1	Volume Control Motor Drive (2SC1213B)	AD	Q536	VS2SC1815GR-1	FF/RWD Solenoid Drive (2SC1815GR)	AC
Q207, Q208	VS2SC1815GR-1	Volume End Detector (2SC1815GR)	AC	Q537	VS2SD235-Y/-1	REC/PB Switch Solenoid Drive (2SD235Y)	AG
Q301, Q302	VS2SC1345-E-1	Function Drive (2SC1345E)	AD	Q538	VS2SC1815GR-1	REC/PB Switch Solenoid Drive (2SC1815GR)	AC
Q303	VS2SC1815GR-1	Muting Control (2SC1815GR)	AC	Q539	VS2SA755-C/-1	REC/PB Switch Solenoid Drive (2SA755C)	AH
Q304	VS2SC1815GR-1	Muting Control (2SC1815GR)	AC	Q540, Q541	VS2SC1815GR-1	REC/PB Switch Solenoid Drive (2SC1815GR)	AC
Q305	VS2SC1815GR-1	Muting Discharge (2SC1815GR)	AC	Q542	VS2SD235-Y/-1	Voltage Regulator (2SD235Y)	AG
Q306	VS2SA872-E/-1	Voltage Regulator (2SA872E)	AE	Q543	VS2SC1815GR-1	FF/RWD Solenoid Drive (2SC1815GR)	AC
Q307	VS2SC1162WC-1	Ripple Filter (2SC1162WC)	AF	Q544	VS2SC1815GR-1	REC/PB Solenoid Drive (2SC1815GR)	AC
Q308	VS2SC1419-K1F	Ripple Filter (2SC1419B)	AG	Q545	VS2SA755-C/-1	REC/PB Solenoid Drive (2SA755C)	AH
Q309	VS2SA561-Y/-1	Power Switching (2SA561Y)	AD	Q546	VS2SC1815GR-1	REC/PB Solenoid Drive (2SC1815GR)	AC
Q401	VS2SC1419-K1F	Voltage Regulator (2SC1419B)	AG	Q547	VS2SC1815GR-1	Reel Motor Drive (2SC1815GR)	AC
Q402	VS2SC1815GR-1	Space Indicator Drive (2SC1815GR)	AC	Q548	VS2SC1815GR-1	APSS Muting (2SC1815GR)	AC
Q403	VS2SC1815GR-1	Line Muting Drive (2SC1815GR)	AC	Q601, Q602, Q603	VS2SC945AK/-1	Muting Control (2SC945AK)	AB
Q404	VS2SC1815GR-1	Line Muting Drive (2SC1815GR)	AC	Q701, Q702, Q703, Q704	VS2SC1815GR-1	Constant Current Circuit (2SC1815GR)	AC
Q405	VS2SC1815GR-1	Inverter (2SC1815GR)	AC	Q801, Q802, Q803, Q804	VS2SC1815GR-1	Function Selector Switching (2SC1815GR)	AC
Q406	VS2SC1815GR-1	Inverter (2SC1815GR)	AC	Q805, Q806, Q807, Q808, Q809	VS2SA733-P/-1	Tuner +B Switching (2SA733P)	AD
Q501, Q502	VS2SC1815GR-1	AND Circuit (2SC1815GR)	AC	Q810	VS2SC1815GR-1	Function Selector Switching (2SC1815GR)	AC
Q503	VS2SC1815GR-1	Line Muting (2SC1815GR)	AC	Q811	VS2SA893-E/-1	FM Pre-set Muting (2SA893E)	AD
Q504	VS2SC458-D/-1	ALC Drive (2SC458D)	AC	Q812	VS2SC1815GR-1	Touch Control Section (2SC1815GR)	AC
Q505, Q506	VS2SC1583G-1F	ALC Drive (2SC1583G)	AF	Q813	VS2SC1815GR-1	Touch Sensor Drive (2SC1815GR)	AC
Q507, Q508	VS2SC1775E/-1	Record Pre-Amp. (2SC1775E)	AD	Q814, Q815, Q816, Q817	VS2SC1815GR-1	Constant Current Circuit (2SC1815GR)	AC
Q509, Q510, Q511, Q512	VS2SC458-D/-1	Level Meter Drive (2SC458D)	AC	Q818	VS2SC1815GR-1	Touch Control Section (2SC1815GR)	AC
Q513, Q514	VS2SC1815GR-1	Line Muting (2SC1815GR)	AC	Q819	VS2SC1213-C-3	APSS Indicator Drive (2SC1213C)	AD
Q515, Q516	VS2SC458-D/-1	Record Equalizer Amp. (2SC458D)	AC				
Q517	VS2SC1214-C-1	Bias OSC (2SC1214C)	AD				
Q518, Q519, Q520	VS2SD235-Y/-1	Voltage Regulator (2SD235Y)	AG				
Q521, Q522, Q523	VS2SC458-D/-1	Level Comparison (2SC458D)	AC				
Q524	VS2SC458-D/-1	Auto Stop Control (2SC458D)	AC				
Q525	VS2SC1815GR-1	Reel Motor Drive (2SC1815GR)	AC				
	VS2SC1162WC-1	Reel Motor Drive (2SC1162WC)	AF				
Q526, Q527	VS2SA715WCP-3	Reel Motor Drive (2SA715WC)	AF				
Q528	VS2SC1815GR-1	Reel Motor Drive (2SC1815GR)	AC				

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
Q820	VS2SC1213-C-3	REV Indicator Drive (2SC1213C)	AD	Q1122	91Z2SC1449L	Drive Circuit (2SC1449L), (X52)	**
Q821	VS2SC1213-C-3	FWD Indicator Drive (2SC1213C)	AD	Q1123	91Z2SC1449L	Drive Circuit (2SC1449L), (X53)	**
Q822, Q823	VS2SC1815GR-1	Multi-Vibrator, APSS Indicator (2SC1815GR)	AC	Q1124	91Z2SC1449L	Constant Voltage Circuit (2SC1449L), (X54)	**
Q824	VS2SA733-P/-1	Current Source (2SA733P)	AD	Q1125	91Z2SC1573	Neon Lamp Drive (2SC1573), (X55)	AH
Q825, Q826	VS2SC1815GR-1	Inverter (2SC1815GR)	AC				
Q827	VS2SC1815GR-1	Power Reset Circuit (2SC1815GR)	AC				
						DIODES	
Q901, Q902	VS2SC1815GR-1	Record Size Detect Amp. (2SC1815GR)	AF	D101, D102	VHD1N60////-1	Rectifier for AGC (1N60)	AB
Q903, Q904	VS2SC1815GR-1	Inverter (2SC1815GR)	AF	D103	VHD1S1555V/1G	FM Muting (1S1555)	AB
Q905	VS2SA733-P/-1	Relay Drive (2SA733P)	AD	D104	VHD1S1555V/1G	Level Shift, Signal Strength Meter (1S1555)	AB
Q906, Q907	VS2SC1213-C-1	EP/LP Solenoid Drive (2SC1213C)	AF	D105	VHD1S1555V/1G	Protector, Reverse Current (1S1555)	AB
Q908	VS2SA673-C/-1	Arm Control Motor Drive (2SA673C)	AD	D106, D107	VHD1S1555V/1G	Band Selector Switching (1S1555)	AB
Q909	VS2SA673-C/-1	Motor (DDM) Drive (2SA673C)	AD	D108, D109, D110	VHD3A243A// -1	Band Selector Switching (3A243A)	AC
Q910	VS2SB647-C/-1	Motor (DDM) Drive (2SB647C)	AG	D111, D112, D113, D114	VHD1S1555V/1G	Band Selector Switching (1S1555)	AB
Q911, Q912, Q913, Q914	VS2SC1815GR-1	Inverter (2SC1815GR)	AF	D115	VHD3A243A// -1	Band Selector Switching (3A243A)	AC
Q1001	91Z2SC945	Return Sensor Section (2SC945), (TR1)	AF	D116, D117	VHD1S1555V/1G	Band Selector Switching (1S1555)	AB
Q1002	91Z2SC945	Return Sensor Section (2SC945), (TR2)	AF	D118	VHD3A243A// -1	Band Selector Switching (3A243A)	AC
Q1003	91Z2SC945	Return Sensor Section (2SC945), (TR3)	AF	D119, D120, D121, D122, D123, D124, D125, D126, D127, D128, D129, D130, D131, D132, D133, D134	VHD1S1555V/1G	Band Selector Switching (1S1555)	AB
Q1004	91Z2SC945	Return Sensor Section (2SC945), (TR4)	AF	D135, D136, D137, D138, D139, D140	VHD10E1////-1	Temperature Regulator (10E1)	AC
Q1101	91Z2SA641	Amplifier (2SA641), (X31)	AG	D141	VHD1N60////-1	Temperature Regulator (1N60)	AB
Q1102	91Z2SA641	Amplifier (2SA641), (X32)	AG	D142, D143, D144, D145, D146, D147, D148, D149	VHD1S1555V/1G	Temperature Regulator and Reverse Current Protector (1S1555)	AB
Q1103	91Z2SC945	Amplifier (2SC945), (X33)	AF				
Q1104	91Z2SC945	Amplifier (2SC945), (X34)	AF				
Q1105	91Z2SC945	Frequency Multiple Circuit (2SC945), (X35)	AF				
Q1106	91Z2SC945	Saw Tooth Wave Generator (2SC945), (X36)	AF				
Q1107	91Z2SC945	Comparator Circuit (2SC945), (X37)	AF				
Q1108	91Z2SC945	Comparator Circuit (2SC945), (X38)	AF				
Q1109	91Z2SC641	Comparator Circuit (2SC641), (X39)	AG				
Q1110	91Z2SC945	Amplifier (2SC945), (X40)	AF				
Q1111	91Z2SB605	Amplifier (2SB605), (X41)	AH				
Q1112	91Z2SC733	Drive Circuit (2SC733), (X42)	AF				
Q1113	91Z2SC733	Drive Circuit (2SC733), (X43)	AF				
Q1114	91Z2SC733	Drive Circuit (2SC733), (X44)	AF				
Q1115	91Z2SC733	Drive Circuit (2SC733), (X45)	AF				
Q1116	91Z2SC945	Drive Circuit (2SC945), (X46)	AF				
Q1117	91Z2SC945	Drive Circuit (2SC945), (X47)	AF				
Q1118	91Z2SC945	Drive Circuit (2SC945), (X48)	AF				
Q1119	91Z2SC945	Drive Circuit (2SC945), (X49)	AF				
Q1120	91Z2SC1449L	Drive Circuit (2SC1449L), (X50)	**				
Q1121	91Z2SC1449L	Drive Circuit (2SC1449L), (X51)	**				

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
D150	VHD1S1555V/1G	Protector, Reverse Current (1S1555)	AB	D402, D403, D404, D405, D406, D407, D408, D409, D410, D411	VHD1S1555V/1G	AND Circuit (1S1555)	AB
D152, D153	VHD1S1555V/1G	Band Selector Switching (1S1555)	AB	D412, D413, D414, D415, D416, D417, D418	VHD1S1555V/1G	OR Circuit (1S1555)	AB
D201, D202, D203, D204, D205, D206, D207, D208, D209, D210, D211, D212, D213, D214, D215	VHD1S1555V/1G	Fuction Selector Switching (1S1555)	AB	D419, D420, D421, D422, D423, D424	VHD1S1555V/1G	AND Circuit (1S1555)	AB
D223	VHD1S1555V/1G	Volume Indicator Drive (1S1555)	AB	D503, D504, D505, D506, D507, D508, D509, D510, D511, D512	VHD1N60-PP/1G	ALC Drive (1N60PP)	AB
D224, D225	VHD1S2076/-1	Protector, Motor Drive Circuit (1S2076)	AB	D513, D514, D515, D516, D517	VHD1N60////-1	Level Meter Drive (1N60)	AB
D226, D227	VHD1S1555V/1G	Protector, Reverse Current (1S1555)	AB	D518	VHD10E1////-1	REC/PB and FF/RWD Solenoid Drive (10E1)	AC
D301	VHD1S1555V/1G	Protector, Transistor Q301/Q302 (1S1555)	AB	D519	VHD1S1555V/1G	REC/PB and FF/RWD Solenoid Drive (1S1555)	AB
D302	VHD1S1555V/1G	Protector, Reverse Current (1S1555)	AB	D521	VHD10E1////-1	Surge Absorber (10E1)	AC
D303	VHD1S1555V/1G	Protector, Transistor Q304 (1S1555)	AB	D522	VHD10E1////-1	REC/PB Switch Solenoid Drive (10E1)	AC
D304, D305, D306, D307, D308, D309, D310, D311, D312	VHD10E1////-1	Rectifier (10E1)	AC	D523, D524	VHD1S1555V/1G	REC/PB Switch Solenoid Drive (1S1555)	AB
D313	VHD10E1////-1	Rectifier (10E1)	AC	D525	VHD10E1////-1	Surge Absorber (10E1)	AC
D314	VHVHV46-G/-1	Temperature Regulator (HV46)	AC	D526	VHD10E1////-1	REC/PB and FF/RWD Solenoid Drive (10E1)	AC
D315, D316, D317, D318, D319, D320, D321, D322, D323, D324, D325, D326, D327, D328, D329	VHD10E1////-1	Rectifier (10E1)	AC	D527	VHD1S2473/-1	Reel Motor Drive (1S2473)	AB
D330	VHD1S1555V/1G	Protector, Transistor Q301/Q302 (1S1555)	AB	D529	VHD10E1////-1	Surge Absorber (10E1)	AC
D331	VHD1S1555V/1G	Protector, Reverse Current (1S1555)	AB	D530	VHD1S1555V/1G	Record Muting (1S1555)	AB
D381, D382	VHD10E1////-1	Rectifier (10E1)	AC	D680, D681	VHD1S1555V/1G	Muting Control (1S1555)	AB
D383	VHD10E1////-1	Surge Absorber (10E1)	AC	D801	VHD1S1555V/1G	Discharge Circuit (1S1555)	AB
D401	VHD1S1555V/1G	AND Circuit (1S1555)	AB	D802, D803, D804, D805, D806, D807, D808, D809, D810	VHD1S1555V/1G	Level Shift (1S1555)	AB
					VHD1S1555V/1G	OR Circuit (1S1555)	AB
					VHD1S1555V/1G	Level Shift (1S1555)	AB

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
D811, D812 D813 D814, D815	VHD1S1555V/1G	Protector, Reverse Current (1S1555)	AB	D708	RH-PX1007AFZZ	Touch Switch with Indicator, LW (Green)	AH
D816	VHD1S1555V/1G	OR Circuit (1S1555)	AB	D709	RH-PX1006AFZZ	Touch Switch with Indicator, U1 (Red)	AH
D818, D819	VHD1S1555V/1G	Level Shift (1S1555)	AB	D710	RH-PX1006AFZZ	Touch Switch with Indicator, U2 (Red)	AH
D820	VHD1S1555V/1G	OR Circuit (1S1555)	AB	D711	RH-PX1006AFZZ	Touch Switch with Indicator, U3 (Red)	AH
D901, D902	VHD1S1555V/1G	Discharge Circuit (1S1555)	AB	D712	RH-PX1006AFZZ	Touch Switch with Indicator, U4 (Red)	AH
D903, D904	VHD1S1555V/1G	Surge Absorber (1S1555)	AB	D713	RH-PX1006AFZZ	Touch Switch with Indicator, U5 (Red)	AH
D905, D906	VHD10E1////-1	Surge Absorber (10E1)	AC	D714	RH-PX1006AFZZ	Touch Switch with Indicator, U6 (Red)	AH
D1001	VHD1S1555V/1G	Discharge Circuit (1S1555)	AB	D715	RH-PX1006AFZZ	Touch Switch with Indicator, U7 (Red)	AH
D1002	91Z1S953	Protector, Reverse Current (1S953) (X2)	AE	D716	RH-PX1006AFZZ	Touch Switch with Indicator, MANUAL (Red)	AH
D1101	91Z1S953	Protector, Reverse Current (1S953) (X3)	AE	D717	RH-PX1006AFZZ	Touch Switch with Indicator, PLAY (Red)	AH
D1102	91ZMV-12	Rference Voltage Circuit (MV-12) (D31)	AE	D718	RH-PX1006AFZZ	Touch Switch with Indicator, PLAY (Red)	AH
D1103	91Z1S953	Drive Circuit (1S953) (D32)	AE	D719	RH-PX1006AFZZ	Touch Switch with Indicator, CUT (Red)	AH
ZD301	91Z1S953	Drive Circuit (1S953) (D33)	AE	D720	RH-PX1006AFZZ	Touch Switch with Indicator, REPEAT (Red)	AH
ZD302	VHEHZ-150//1F	15V Zener (WZ150)	AC	D721	RH-PX1006AFZZ	Touch Switch with Indicator, STOP (Red)	AH
ZD501	VHEHZ12-BBK-1	12V Zener (HZ12B)	AD	D722	RH-PX1006AFZZ	Touch Switch with Indicator, PLAY (Red)	AH
ZD503	VHEHZ20////-1	DC 20V Fixed Voltage Regulator (HZ20)	AD	D723	RH-PX1006AFZZ	Touch Switch with Indicator, RWD (Red)	AH
ZD504	VHEXZ-090/-1	DC 9V Fixed Voltage Regulator (WZ-090)	AD	D724	RH-PX1006AFZZ	Touch Switch with Indicator, FF (Red)	AH
ZD801	VHEWZ-115/-1	DC 11.5V Fixed Voltage Regulator (WZ-115)	AC	D725	RH-PX1007AFZZ	Touch Switch with Indicator, APSS REV (Green)	AH
ZD901	VHEWZ-050/-1	DC 5V Fixed Voltage Regulator (WZ-050)	AC	D726	RH-PX1007AFZZ	Touch Switch with Indicator, APSS FWD (Green)	AH
ZD901	VHEBZ-061/-1	DC 6V Fixed Voltage Regulator (BZ-061)	AC	D727	RH-PX1006AFZZ	Touch Switch with Indicator, PAUSE (Red)	AH
ZD1001	91ZRD7,5EC	DC 7.5V Zener (RD7.5EC), (X1)	**	D728	RH-PX1006AFZZ	Touch Switch with Indicator, SPACE (Red)	AH
ZD1101	91ZRD13EB	DC 13V Zener (RD13EB), (ZD31)	**				
LED (Light Emitting Diode)							
D216, D217, D218, D219, D220, D221, D222	RH-PX1008AFZZ	Volume Indicator (GL-9PR2)	AD	L101, L102	VP-LH100M0000	10μH, Choke	AB
D384	VHPGL3AR2/-1	Power Source Indicator (GL3AR2)	AD	L103	RCILZ0052AFZZ	18μH, Phase Shift	AB
D701	RH-PX1006AFZZ	Touch Switch with Indicator, Stand-by (Red)	AH	L104, L105	RCILI0011SGZZ	19kHz, Low Pass Filter	AG
D702	RH-PX1007AFZZ	Touch Switch with Indicator, MIC/AUX (Green)	AH	L106	RCILA0425AFZZ	SW Antenna	AD
D703	RH-PX1007AFZZ	Touch Switch with Indicator, PHONO (Green)	AH	L107	RCILZ0060AFZZ	92mH, Choke	AE
D704	RH-PX1007AFZZ	Touch Switch with Indicator, TAPE (Green)	AH	L108, L109,	RCILA0423AFZZ	AM Antenna Ass'y	AN
D705	RH-PX1007AFZZ	Touch Switch with Indicator, FM (Green)	AH	L110			
D706	RH-PX1007AFZZ	Touch Switch with Indicator, SW (Green)	AH	L111	RCILB0391AFZZ	SW Oscillator	AE
D707	RH-PX1007AFZZ	Touch Switch with Indicator, MW (Green)	AH	L112	RCILB0427AFZZ	MW Oscillator	AD
				L113	RCILB0388AFZZ	LW Oscillator	AD
				L114, L115	VP-LH101M0000	100μH, Choke	AB
				L117	VP-LH470M0000	47μH, Choke	AB
				L118	VP-LH100M0000	10μH, Choke	AB
				L201	VP-LH101M0000	100μH, Choke	AB
				L301	VP-LH101M0000	100μH, Choke	AB

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
L302, L303	VP-LH101M0000	100μH, Choke	AB	VR106	RVR-M0065AGZZ	4.7K ohm (B), High Frequency Adjust	AF
L304	VP-LH100M0000	10μH, Choke	AB	VR108	RVR-Z0065AFZZ	100K ohm (B), FM Pre-set Tuning (U1)	AG
L501, L502	RCILL0057AFZZ	MPX Filter (Dolby NR)	AF	VR109	RVR-Z0065AFZZ	100K ohm (B), FM Pre-set Tuning (U2)	AG
L503, L504	RCILL0054AFZZ	MPX Filter (Dolby NR)	AG	VR110	RVR-Z0065AFZZ	100K ohm (B), FM Pre-set Tuning (U3)	AG
L505, L506, L507, L508, L509, L510	RCILZ0019AGZZ	6.8mH, Record Equalizer	AD	VR111	RVR-Z0065AFZZ	100K ohm (B), FM Pre-set Tuning (U4)	AG
L511	RCILB0419AFZZ	Bias Oscillator	AE	VR112	RVR-Z0065AFZZ	100K ohm (B), FM Pre-set Tuning (U5)	AG
L512, L513	RCILB0420AFZZ	Bias Step up	AE	VR113	RVR-Z0065AFZZ	100K ohm (B), FM Pre-set Tuning (U6)	AG
L517, L518	VP-LH101M0000	100μH, Choke	AB	VR114	RVR-Z0065AFZZ	100K ohm (B), FM Pre-set Tuning (U7)	AG
L520, L521, L522	VR-LH101M0000	100μH, Choke	AB	VR201 (A, B)	RVR-Z0066AFZZ	100K ohm (B), Volume Control	AP
TRANSFORMERS				VR202	RVR-Q0064AFZZ	100K ohm (B), Balance	AG
•T1	RTRNP0543AFZZ	Main Power	BQ	VR203 (A, B)	RVR-P0064AFZZ	100K ohm (A), Treble	AK
•T2	RTRNP0544AFZZ	Sub Power	AV	VR204 (A, B)	RVR-P0064AFZZ	100K ohm (A), Bass	AK
T101	RCILD0055AFZZ	FM Quadrature	AE	VR501, VR502	RVR-M0127AFZZ	10K ohm (B), Playback Sensitivity Adjust	AC
T102	RCILD0056AFZZ	FM Quadrature	AE	VR503, VR504	RVR-Q0063AFZZ	50K ohm (A), Record Level Control	AF
•T103	RCILIO209AFZZ	AM IF (455kHz)	AH	VR505, VR506	RVR-M0127AFZZ	10K ohm (B), Level Meter Sensitivity Adjust	AC
T104	RCILIO222AFZZ	AM IF Trap Filter	AD	VR507, VR508, VR509, VR510	RVR-M0127AFZZ	10K ohm (B), Overall Sensitivity Adjust	AC
•T105	RCILIO219AFZZ	AM IF (455kHz)	AE	VR511, VR512	RVR-M0126AFZZ	5K ohm (B), Overall Sensitivity Adjust	AC
CERAMIC FILTERS				VR513, VR514	RVR-M0127AFZZ	10K ohm (B), Bias Adjust	AC
CF101, CF102	RFILF0009AFZZ	FM IF	AE	VR801	RVR-M0178AFZZ	2.2K ohm (B), FM Pre-set Muting Adjust	AE
THERMISTER					RTUNV0050AFZZ	FM Tuner (Front-end) Ass'y	BB
PH301	RH-QX1002AFZZ	Power IC Protector (Positive)	AG	VR1001	91ZSR19R100	100K ohm (B), Arm Return Sensor Adjust (RV1)	AE
CONTROLS				VR1002	91ZSR19R1K	1K ohm (B), Sensor Sensitivity Adjust (RV2)	AE
VC101, VC102, VR107	RVC-A0050AFZZ	Variable Tuning Gang	AX	VR1101	91ZSR19R330	330 ohm (B), Frequency Multiple Adjust (VR31)	AE
TC101	RTO-H1007AFZZ	Trimmer, SW Antenna	AC	VR1102	91ZSR19R5K	5K ohm (B), Turntable Speed (33-1/3 r.p.m.) Adjust (VR32)	AE
TC102	RTO-H1007AFZZ	Trimmer, MW Antenna	AC	VR1103	91ZSR19S5K	5K ohm (B), Turntable Speed (45 r.p.m.) Adjust (VR33)	AE
TC103	RTO-H1007AFZZ	Trimmer, LW Antenna	AC	VR1104	91ZCR19R330	330 ohm (B), Hall Device Adjust (VR34)	AE
TC104	RTO-H1053AFZZ	Trimmer, SW Oscillator	AC	VR1105	91ZV8K4-1-500	500 ohm (B), 4 Coil Current Adjust (VR35)	AE
TC105	RTO-H1053AFZZ	Trimmer, MW Oscillator	AC	VR1106	91ZV8K4-1-500	500 ohm (B), 4 Coil Current Adjust (VR36)	AE
TC106	RTO-H1053AFZZ	Trimmer, LW Oscillator	AC	VR1107	91Z5K	5K ohm (B), Stroboscope Frequency Adjust (VR37)	AE
VR101	RVR-M0144AFZZ	6.8K ohm (B), V.C.O. Adjust	AD	ELECTROLYTIC CAPACITORS			
VR102	RVR-M0141AFZZ	1K ohm (B), Separation Adjust	AD	C1, C2	RC-PZ061CAFZZ	.05MFD, 250V, Oil	AG
VR103	RVR-M0179AFZZ	22K ohm (B), Low Frequency Adjust	AE	C108	VCAAAU1EB474K	.47MFD, 25V, ±10%, Aluminum	AC
VR104	RVR-M0128AFZZ	20K ohm (B), FM Pre-set Meter Adjust	AC				
VR105	RVR-M0126AFZZ	5K ohm (B), FM Pre-set Meter Adjust	AC				

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
C111	VCEAAU1HW105A	1MFD, 50V, +75 -10%	AB	C303,	VCEALU1EC335A	3.3MFD, 25V, +75 -10%	AC
C118	VCEAAU1EW475A	4.7MFD, 25V, +75 -10%	AB	C304			
C119	VCEAAU1HW105A	1MFD, 50V, +75 -10%	AB	C305,	RC-EZ1012AFZZ	47MFD, 50V	AC
C123	VCEAAU1EW336Y	33MFD, 25V, +50 -10%	AC	C306			
C125	VCEAAU1VW107Y	100MFD, 35V, +50 -10%	AD	C307,	RC-EZ1038AFZZ	47MFD, 16V	AB
C127	VCAAAU1EB224K	.22MFD, 25V, ±10%	AC	C308			
C128	VCAAAU1EB474K	.47MFD, 25V, ±10%	AC	C315	VCEAAU1HW107Y	100MFD, 50V, +50 -10%	AD
C129,	VCEAAU1EW335A	3.3MFD, 25V, +75 -10%	AB	C317	VCEAAU1HW105A	1MFD, 50V, +75 -10%	AB
C130				C318	VCEAAU1HW476Y	47MFD, 50V, +50 -10%	AC
C162	VCEAAU1EW475A	4.7MFD, 25V, +75 -10%	AB	C319	VCEAAU1JW337Y	330MFD, 63V, +50 -10%	AF
C169	VCEAAU1VW107Y	100MFD, 35V, +50 -10%	AD	C320	VCEASU1HW337Y	330MFD, 50V, +50 -10%	**
C171,	VCEAAU1EW335A	3.3MFD, 25V, +75 -10%	AB	C321	VCEAAU1HW105A	1MFD, 50V, +75 -10%	AB
C172				C322	VCEAAU1EW107Y	100MFD, 25V, +50 -10%	AC
C177	VCAAAU1EB104K	.1MFD, 25V, ±10%, Aluminum	AC	C323	VCEAAU1EW227Y	220MFD, 25V, +50 -10%	AC
C179	VCEAAU1AW107Y	100MFD, 10V, +50 -10%	AB	C324	VCEAAU1VW108Y	1000MFD, 35V, +50 -10%	AG
C181,	VCEAAU1HW105A	1MFD, 50V, +75 -10%	AB	C327	VCEAAU1HW107Y	100MFD, 50V, +50 -10%	AD
C182				C329,	VCEAAU1CW106Y	10MFD, 16V, +50 -10%	AB
C183	VCEAAU1AW227Y	220MFD, 10V, +50 -10%	AC	C330			
C201,	VCEALU1EC335A	3.3MFD, 25V, +75 -10%	AC	C335	VCEAAU1VW228Y	2200MFD, 35V, +50 -10%	AK
C202				C337	VCEAAU1CW477Y	470MFD, 16V, +50 -10%	AD
C203,	VCEAAU1AW107Y	100MFD, 10V, +50 -10%	AB	C338	RC-EZ1062AFZZ	2200MFD, 16V	AF
C204				C339	RC-EZS228AF1G	2200MFD 40V	AH
C213,	VCEAAU1HW105A	1MFD, 50V, +75 -10%	AB	C340	RC-EZ1074AFZZ	33MFD, 100V	AD
C214				C341	VCEAAU1VW107Y	100MFD, 35V, +50 -10%	AD
C215,	VCEAAU1EW106Y	10MFD, 25V, +50 -10%	AB	C344,	RC-EZS568AF1G	5600MFD, 42V	AP
C216				C345			
C217	VCEAAU1HW107Y	100MFD, 50V, +50 -10%	AD	C346	VCEAAU2CW336Y	33MFD, 160V, +50 -10%	AE
C218,				C347	RC-EZ1013AFZZ	10MFD, 50V	AB
C219,				C348	VCEAAU1CW108Y	1000MFD, 16V, +50 -10%	AE
C220,	VCEAAU1HW336Y	33MFD, 50V, +50 -10%	AC	C349,	RC-EZ1012AFZZ	47MFD, 50V	AC
C221,				C350			
C222				C351,	VCEAAU1HW106Y	10MFD, 50V, +50 -10%	AC
C223,				C352			
C224				C357	VCEAAU1EW476Y	47MFD, 25V, +50 -10%	AC
C225,				C358	VCEAAU1JW336Y	33MFD, 63V, +50 -10%	AC
C226,				C359	VCEAAU1HW477Y	470MFD, 50V, +50 -10%	AG
C227,				C380	VCEAAU1EW106Y	10MFD, 25V, +50 -10%	AB
C228,	VCEALU1HC105A	1MFD, 50V, +75 -10%	AC	C385	VCEAAU1VW477Y	470MFD, 35V, +50 -10%	AE
C229,				C402,			
C230,				C403,			
C231,				C404,	VCEAAU1HW105A	1MFD, 50V, +75 -10%	AB
C232,				C405,			
C233,				C406,			
C234				C407			
C237,	VCEALU1EC335A	3.3MFD, 25V, +75 -10%	AC	C409,	VCEAAU1HW105A	1MFD, 50V, +75 -10%	AB
C238				C410			
C239,	VCEAAU1AW107Y	100MFD, 10V, +50 -10%	AB	C411,			
C240				C413,	VCEALU1HW105M	1MFD, 50V, ±20%	AD
C245,	VCEALU1HW224M	.22MFD, 50V, ±20%	AB	C414			
C246				C415	VCEALU1CW106M	10MFD, 16V, ±20%	AB
C247,	VCEAAU1EW106Y	10MFD, 25V, +50 -10%	AB	C418,	VCEALU1HW105M	1MFD, 50V, ±20%	AD
C248				C419			
C257,	VCEALU1HW224M	.22MFD, 50V, ±20%	AB	C420	VCEAAU1AW227Y	220MFD, 10V, +50 -10%	AC
C258				C426	VCEAAU1CW106Y	10MFD, 16V, +50 -10%	AB
C259,	VCEAAU1AW107Y	100MFD, 10V, +50 -10%	AB	C428	VCEAAU1HW105A	1MFD, 50V, +75 -10%	AB
C260				C429	VCEAAU1AW336Y	33MFD, 10V, +50 -10%	AB
C263,	VCEAAU1CW106Y	10MFD, 16V, +50 -10%	AB	C430,	VCEAAU1CW106Y	10MFD, 16V, +50 -10%	AB
C264				C431			
C265,	VCEAAU1HW105A	1MFD, 50V, +75 -10%	AB	C432,	VCEAAU1HW105A	1MFD, 50V, +75 -10%	AB
C266				C433			
C271,	VCEALU1HW104M	.1MFD, 50V, ±20%	AB	C434	VCEAAU1EW475A	4.7MFD, 25V, +75 -10%	AB
C272				C436	VCEAAU1CW106Y	10MFD, 16V, +50 -10%	AB
C277	VCEAAU1HW476Y	47MFD, 50V, +50 -10%	AC	C501,	VCEALU1HC225A	2.2MFD, 50V, +75 -10%	AC
C278	VCEAAU1HW107Y	100MFD, 50V, +50 -10%	AD	C502			
C291	VCEAAU1HW106Y	10MFD, 50V, +50 -10%	AC	C509	VCEAAU1AW227Y	220MFD, 10V, +50 -10%	AC
C292	VCEAAU1HW105A	1MFD, 50V, +75 -10%	AB				

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
C510	VCEAAU1AW227Y	220MFD, 10V, +50 –10%	AC	C607	VCEAAU1AW336Y	33MFD, 10V, +50 –10%	AB
C511, C512	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB	C608	VCEAAU1EW106Y	10MFD, 25V, +50 –10%	AB
C515	VCEAAU1CW227Y	220MFD, 16V, +50 –10%	AC	C610, C611	VCEAAU1CW476Y	47MFD, 16V, +50 –10%	AC
C516	VCEAAU1EW227Y	220MFD, 25V, +50 –10%	AC	C614	VCEAAU1CW107Y	100MFD, 16V, +50 –10%	AC
C517	VCEAAU1CW227Y	220MFD, 16V, +50 –10%	AC	C619, C620	VCEALU1HW104M	.1MFD, 50V, ±20%	AB
C518	VCEAAU1AW107Y	100MFD, 10V, +50 –10%	AB	C621, C622	VCEAAU1AW336Y	33MFD, 10V, +50 –10%	AB
C519, C520, C521, C522	VCEALU1HW105M	1MFD, 50V, ±20%	AD	C680, C681, C683, C684, C685, C686, C687			
C523, C524	VCSATU1EF105M	1MFD, 25V, ±20%, Tantalum	AC	C770, C771	VCEALU1EW475M	4.7MFD, 25V, ±20%	AD
C525	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB	C758	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB
C526	VCEAAU1CW477Y	470MFD, 16V, +50 –10%	AD	C759, C760	VCEAAU1EW106Y	10MFD, 25V, +50 –10%	AB
C527, C528	VCEAAU1AW227Y	220MFD, 10V, +50 –10%	AC	C802	VCEAAU1AW476Y	47MFD, 10V, +50 –10%	AB
C529, C530, C535, C536, C537, C538	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB	C803, C804, C805, C806	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C543, C544	VCAAAU1EB104K	.1MFD, 25V, ±10%, Aluminum	AC	C807	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB
C545, C546	VCAAAU1EB334K	.33MFD, 25V, ±10%	AC	C812	VCEAAU1EW476Y	47MFD, 25V, +50 –10%	AC
C547, C548, C549, C550	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB	C813	VCEAAU1AW476Y	47MFD, 10V, +50 –10%	AB
C551, C552	VCEAAU1EW335A	3.3MFD, 25V, +75 –10%	AB	C815	VCEALU1HW224M	.22MFD, 50V, ±20%	AB
C553, C554	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB	C820, C826	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C555	VCEAAU1EW475A	4.7MFD, 25V, +75 –10%	AB	C828	VCSATU1EF105M	1MFD, 25V, ±20%, Tantalum	AC
C556, C557, C558, C559, C560, C561	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB	C829	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C574	VCEAAU1VW107Y	100MFD, 35V, +50 –10%	AD	C830	VCSATU1EF105M	1MFD, 25V, ±20%, Tantalum	AC
C581	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB	C831	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C582	VCEAAU1VW107Y	100MFD, 35V, +50 –10%	AD	C835, C836	VCEALU1EW106M	10MFD, 25V, ±20%	AB
C583	VCEAAU1HW476Y	47MFD, 50V, +50 –10%	AC	C841	VCEAAU1AW336Y	33MFD, 10V, +50 –10%	AB
C586	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB	C901, C903	91Z4.7MF25V	4.7MFD, 25V	AG
C588	VCEAAU1CW107Y	100MFD, 16V, +50 –10%	AC	C905, C909	91Z47MF10V	47MFD, 10V	AC
C589	VCEALU1HW474M	.47MFD, 50V, ±20%	AB	C910			
C590	VCEALU1HW335M	3.3MFD, 50V, ±20%	AC	C913	91Z10MF16V	10MFD, 16V	AC
C591	VCEALU1HW474M	.47MFD, 50V, ±20%	AB	C914, C915	91Z100MF10V	100MFD, 10V	AG
C592	VCEALU1HW105M	1MFD, 50V, ±20%	AD	C917	91Z4.7MF25V	4.7MFD, 25V	AG
C593	VCEAAU1EW106Y	10MFD, 25V, +50 –10%	AB	C918	91Z0.47MF50V	3.3MFD, 50V	AC
C594	VCEAAU1AW107Y	100MFD, 10V, +50 –10%	AB	C930	91Z100MF10V	100MFD, 10V	AG
C595	VCEAAU1AW336Y	33MFD, 10V, +50 –10%	AB	C1001	91Z33MF25V	33MFD, 25V, ±20% (C1)	AG
C596	VCEAAU1CW107Y	100MFD, 16V, +50 –10%	AC	C1002	91Z1MF50V	1MFD, 50V (C2)	AG
C597, C598	VCEAAU1CW476Y	47MFD, 16V, +50 –10%	AC	C1003	91Z10MF16V	10MFD, 16V (C3)	AC
C600	VCEAAU1HW476Y	47MFD, 50V, +50 –10%	AC	C1004	91Z0.47FM50V	.47MFD, 50V (C4)	AC
C601	VCEAAU1AW336Y	33MFD, 10V, +50 –10%	AB	C1105	91Z1MF50V	1MFD, 50V (C35)	AG
C603	VCEAAU1HW476Y	47MFD, 50V, +50 –10%	AC	C1106	91Z1MF50V	1MFD, 50V (C36)	AG
C604	VCEAAU1HW335A	3.3MFD, 50V, +75 –10%	AB	C1107	91Z0.47MF50V	.47MFD, 50V (C37)	AC
C605	VCEAAU1HW106Y	10MFD, 50V, +50 –10%	AC	C1108	91Z100MF25V	100MFD, 25V (C38)	AG
C606	VCEAAU1HW476Y	47MFD, 50V, +50 –10%	AC	C1109	91Z1MF50V	1MFD, 50V (C39)	AG
				C1110	91Z1MF50V	1MFD, 50V (C40)	AG
				C1111	91Z1MF50V	1MFD, 50V (C41)	AG
				C1112	91Z1MF50V	1MFD, 50V (C42)	AG
				C1115	91Z0.22MF50V	.22MFD, 50V (C45)	AC
				C1116	91Z0.22MF50V	.22MFD, 50V (C46)	AC

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
CAPACITORS				C801, C811, C851	VCQYKU1HM683K	.068MFD, 50V, $\pm 10\%$, Mylar	AC
C120	VCQYKU1HM473K	.047MFD, 50V, $\pm 10\%$, Mylar	AC	C852	VCQYKU1HM223K	.022MFD, 50V, $\pm 10\%$, Mylar	AB
C121, C122	VCQYKU1HM682J	.0068MFD, 50V, $\pm 5\%$, Mylar	AC	C853	VCQYKU1HM683K	.068MFD, 50V, $\pm 10\%$, Mylar	AC
C126	VCQSMU1HS152J	1500PF, 50V, $\pm 5\%$, Styrol	AB	C912, C916	VCQYKU1HM104K	.1MFD, 50V, $\pm 10\%$, Mylar	AC
C132, C134	VCQYKU1HM102K	.001MFD, 50V, $\pm 10\%$, Mylar	AB	C1101	VCQYKU1HM104K	.1MFD, 50V, $\pm 10\%$, Mylar (C31)	AC
C145	VCQSMT1HS472J	4700PF, 50V, $\pm 5\%$, Styrol	AC	C1102	VCQYKU1HM103K	.01MFD, 50V, $\pm 10\%$, Mylar (C32)	AB
C151	VCQSMT1HS471J	470PF, 50V, $\pm 5\%$, Styrol	AB	C1103	VCQYKU1HM103K	.01MFD, 50V, $\pm 10\%$, Mylar (C33)	AB
C153	VCQSMU1HS181J	180PF, 50V, $\pm 5\%$, Styrol	AB	C1104	VCQYKU1HM104K	.1MFD, 50V, $\pm 10\%$, Mylar (C34)	AC
C176	VCQYKU1HM183K	.018MFD, 50V, $\pm 10\%$, Mylar	AB	C1113	VCQYKU1HM104K	.1MFD, 50V, $\pm 10\%$, Mylar (C43)	AC
C197	VCQYKU1HM153K	.015MFD, 50V, $\pm 10\%$, Mylar	AB	C1114	VCQYKU1HM104K	.1MFD, 50V, $\pm 10\%$, Mylar (C44)	AC
C209, C210	VCQYKU1HM153J	.015MFD, 50V, $\pm 5\%$, Mylar	AC	RESISTORS			
C211, C212	VCQYKU1HM563J	.056MFD, 50V, $\pm 5\%$, Mylar	AC	RA701	RMPTC0005AFZZ	Resistor Array, 2.2K ohm x 4	AC
C253, C254	VCQYKU1HM563K	.056MFD, 50V, $\pm 10\%$, Mylar	AC	RA702	RMPTC0007AFZZ	Resistor Array, 10K ohm x 4	AC
C267, C268	VCQYKU1HM122K	.0012MFD, 50V, $\pm 10\%$, Mylar	AB	RA802	RMPTC0006AFZZ	Resistor Array, 4.7K ohm x 4	AC
C269, C270	VCQYKU1HM103K	.01MFD, 50V, $\pm 10\%$, Mylar	AB	R165	VRG-ST2EA330J	33 ohm, 1/4W, $\pm 5\%$, Fusible	AB
C273, C274	VCQYKU1HM153K	.015MFD, 50V, $\pm 10\%$, Mylar	AB	R307, R308, R311, R312	VRG-ST2EA101J	100 ohm, 1/4W, $\pm 5\%$, Fusible	AB
C275, C276	VCQYKU1HM823K	.082MFD, 50V, $\pm 10\%$, Mylar	AC	R329	VRG-ST2EA390J	39 ohm, 1/4W, $\pm 5\%$, Fusible	AB
C289, C290	VCQYKU1HM272K	.0027MFD, 50V, $\pm 10\%$, Mylar	AB	R330	VRG-ST3AA1R0J	1 ohm, 1W, $\pm 5\%$, Fusible	AC
C313, C314, C331, C332, C382, C416, C417, C425	VCQYSH1HM104J	.1MFD, 50V, $\pm 5\%$, Mylar	AC	R340	VRG-ST3AA220J	22 ohm, 1W, $\pm 5\%$, Fusible	AC
C513, C514	VCQYKU1HM682J	.0068MFD, 50V, $\pm 5\%$, Mylar	AC	R344	VRG-ST3AA1R0J	1 ohm, 1W, $\pm 5\%$, Fusible	AC
C531, C532	VCQYKU1HM273J	.027MFD, 50V, $\pm 5\%$, Mylar	AC	R380	VRG-ST2EA4R7J	4.7 ohm, 1/4W, $\pm 5\%$, Fusible	AB
C533, C534	VCQYKU1HM472J	.0047MFD, 50V, $\pm 5\%$, Mylar	AC	R638	VRG-ST2EA561J	560 ohm, 1/4W, $\pm 5\%$, Fusible	AB
C539, C540	VCQYKU1HM473J	.047MFD, 50V, $\pm 5\%$, Mylar	AC	R675	RR-XZ1020AFZZ	22 ohm, 3W, $\pm 10\%$, Fusible	AD
C541, C542	VCQYKU1HM562J	.0056MFD, 50V, $\pm 5\%$, Mylar	AC	TAPE DECK PARTS			
C562, C563	VCQYKU1HM183J	.018MFD, 50V, $\pm 5\%$, Mylar	AC	001	LCHSS0127AFZZ	Sub-chassis	AK
C564, C565	VCQYKU1HM393J	.039MFD, 50V, $\pm 5\%$, Mylar	AC	002	RHEDH0062AFZZ	Head, Record/Playback	AY
C566, C567	VCQYKU1HM153J	.015MFD, 50V, $\pm 5\%$, Mylar	AC	003	RHEDA0061AFZZ	Head, Erase	AK
C568, C569	VCQYKU1HM223J	.022MFD, 50V, $\pm 5\%$, Mylar	AC	004	MLEVF0768AFZZ	Lever, Pinch Roller	AC
C570, C571	VCQYKU1HM153J	.015MFD, 50V, $\pm 5\%$, Mylar	AC	005	LSLVM0077AFFW	Sleeve, Head	AB
C572, C573	VCQYKU1HM682K	.0068MFD, 50V, $\pm 10\%$, Mylar	AB	006	MSPRC0156AFFJ	Spring, Head	AB
C576	VCQYKU1HM333J	.033MFD, 50V, $\pm 5\%$, Mylar	AC	007	MSPRC0031AGMN	Spring, Head Azimuth	AA
C577	VCQYKU1HM153J	.015MFD, 50V, $\pm 5\%$, Mylar	AC	008	NBALS0004AGFJ	Ball	AA
C580	VCQYKU1HM562J	.0056MFD, 50V, $\pm 5\%$, Mylar	AC	009	MSPRT0490AFFJ	Spring, Pinch Roller	AA
C584	VCQYKU1HM223J	.022MFD, 50V, $\pm 5\%$, Mylar	AC	010	RMOTM0076AFZZ	Motor, Reel	AX
C585	VCQYKU1HM102K	.001MFD, 50V, $\pm 10\%$, Mylar	AB	011	NPLYN0001AFZZ	Pulley, Reel Motor	AE
				012	LANGF0411AFZZ	Plate, Motor	AB
				013	MLEVF0766AFZZ	Lever, APSS	AD
				014	MSPRT0497AFFJ	Spring, APSS Lever	AA
				015	RMOTP0050AFZZ	Motor, Capstan	BA
				016	LANGT0652AFZZ	Bracket, Flywheel	AG
				017	LBSHS0001AG00	Cushion Rubber, Motor	AA
				018	LX-BZ0219AFFD	Screw, Motor Retaining	AA
				019	QPWBF0712AFZZ	P.W. Board, Connecting	-
				020	LX-WZ9056AFZZ	Washer, Capstan Motor Retaining	AA
				021	LANGT0661AFZZ	Bracket, Counter	AE
				022	KCOUB0068AFZZ	Counter, Tape	AT
				025	MLEVP0102AFZZ	Lever, Cassette Tape Detector	AE
				026	MSPRT0495AFFJ	Spring, Cassette Tape Detect Lever	AA

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
027	LHLDX3058AFZZ	Cassette Holder (A)	AH	105	91Z896358	Spring, EP/LP Select Lever Ass'y (2)	AC
028	LANGF0416AFZZ	Bracket, Cassette Holder (A)	AD	106	91Z851326	Main Gear	AD
029	MSPRT0498AFFJ	Spring, Cassette Holder Lock Lever	AB	107	91Z896361	Spacer	AD
031	MLEVF0784AFZZ	Lever, Eject	AC	108	91Z896243	Gear	AE
032	MLEVF0770AFZZ	Lever, Cassette Holder Lock	AC	109	91ZDML-148L-3	Motor Ass'y	AX
033	MSPRT0521AFFJ	Spring, Eject Lever	AA	110	91Z896240	Bracket, Motor Ass'y & Gear	AD
034	MSPRT0510AFFJ	Spring, Cassette Holder (A)	AB	111	91Z896250	Operation Lever Ass'y	AG
035	LANGF0417AFZZ	Bracket, Eject Lever	AH	112	91Z891452-2	Friction Rubber	AC
036	LSLVM0075AFFW	Sleeve, Cassette Holder Lock Lever	AB	113	91Z896238	Lever, Motor Switch	AC
037	MSPRT0494AFFJ	Spring, Eject Prevention Lever	AA	114	91Z896453	Solenoid, EP/LP Selector	AS
038	QPWBF0730AFZZ	P.W. Board, Filter (P.W.B. only)	-	115	91Z896349-1	Spring, Solenoid	AC
039	MLEVP0100AFZZ	Lever, Record Safety	AD	116	91Z896245	Lever, EP/LP Selector	AD
040	LANGF0415AFZZ	Bracket, Cassette Holder (B)	AF	117	91Z896537	Bracket, Solenoid	AD
041	PGIDM0062AFZZ	Guide, Cassette Tape (Left)	AE	118	91Z870560	Micro Switch, Motor	AH
042	PGIDM0063AFZZ	Guide, Cassette Tape (Right)	AE	119	91Z890755	Holder, Wire	AA
043	LHLDX3059AFZZ	Cassette Holder (B)	AL	120	91Z896270	Stopper	AC
044	GCOVA1104AFSA	Cover, Cassette Tape Illumination	AF	121	91Z896272	Leg	AH
048	NBRGC0060AFZZ	Bearing, Capstan	AF	122	91Z896272-1	Leg	AH
049	LCHSM0287AFZZ	Main Chassis	-	123	91Z895592	Cover, Lamp	AX
050	MSPRP0169AFFJ	Spring (Plate type), Sub-chassis Retaining	AD	124	91Z895595	Holder, Lamp	AF
051	PCUSG0088AF00	Cushion, Sub-chassis	AB	125	91Z896539	Spacer	AC
052	PCUSG0061AF00	Cushion, Sub-chassis	AB	126	91Z896344-1	Switch, P.W.B. Ass'y	-
053	MSPRT0492AFFJ	Spring, Sub-chassis Return	AB	127	91Z896265	Knob, Speed Selector	AG
054	NIDR-0058AFZZ	Idler, Fast Forward/Rewind	AK	128	91Z895757-1	Neon Lamp Ass'y	AM
055	PGIDM0060AFZZ	Guide, Fast Forward/Rewind Idler	AB	129	91Z894408	Holder, Wire	AA
056	MSPRT0493AFFJ	Spring, Fast Forward/Rewind Idler Guide	AA	130	91Z702986	Volume, Turntable Speed Fine Adjust	AG
057	MLEVF0765AFZZ	Lever, Fast Forward/Rewind Operation	AE	131	91Z702233-3	Tube (3.7φ x 15ℓ)	-
058	MLEVF0764AFZZ	Lever, Sub-chassis Operation	AC	132	91Z896318	Lamp, P.W. B. Ass'y	-
059	MLEVF0767AFZZ	Lever, Take-up Idler Release	AC	133	91Z896352	Photo Transistor, Record-size Detector	AL
060	NIDR-0021AGZZ	Idler, Take-up	AD	134	91Z871418	Micro Switch, Power	AH
061	NDAIR0123AFSA	Turntable, Take-up	AG	135	91Z893327	Insulator, Micro Switch	AB
062	NDAIR0124AFSA	Turntable, Supply	AE	136	91Z892618-1	Knob, Turntable Speed Fine Adjust	AL
063	MLEVP0064AFZZ	Lever, Take-up Idler	AD	137	91Z851379	Pick-up BASE Ass'y	AY
064	MSPRT0491AFFJ	Spring, Take-up Idler Lever	AA		91ZSTY-202	Stylus	AZ
065	LX-WZ5018AGZZ	Washer, Turntable	AA	138	91Z631492	Motor (DDM) with P.W.B. Ass'y	BY
066	LX-WZ5012AGZZ	Washer, Take-up Idler	AA	139	91Z896543	Spacer, Motor Ass'y, Retianing	AB
067	LX-WZ5020AGZZ	Washer, Take-up Idler	AA	140	91Z896355	Arm Control Lever Ass'y	AH
068	MLIFP0001AFZZ	Air Damper, Cassette Holder	AK	141	91Z895072	Eccentric Pin, Auto in Adjust	-
069	NFLYC0058AFZZ	Flywheel	AU	142	91Z801554	Spring, Arm Control Lever	AB
070	NPLYR0050AF00	Pulley, Take-up	AB	143	91Z896527	Terminal Strip (5-lugs) with Cord Ass'y	AN
071	LX-WZ5037AGZZ	Washer, Flywheel	AA	144	91Z871354	Turntable Sheet	AW
072	NBLTH0061AFZZ	Belt, Drive	AD	145	91Z620026-2	Turntable	BM
073	NROLY0013AFZZ	Pressure Pinch Roller	AG	146	91Z896274	Prism, Record-size Detector	AN
074	LANGT0682AFZZ	Bracket, Lamp	AB	147	91Z890876	EP Adaptor	AG
075	LX-WZ9051AFZZ	Washer, Oil Cut	AA	148	91Z896421	Sensor, P.W.B. Ass'y	-
076	NBLTK0122AFZZ	Belt, Tape Counter	AC	149	91Z896320	Sensor Ass'y	-
077	PZETF0129AFZZ	Insulator, Micro Switch	AB	150	91Z891386	Player Control P.W.B. Ass'y	-
078	LANGT0667AFZZ	Bracket, Tape Deck Retaining	AD	151	91Z896275	Prism, Record-size Detector	AN
080	LX-BZ0214AFZZ	Screw, Flywheel Thrust Adjust	AB	152	91Z895591	Bracket, Lamp/Volume	-
					91Z851378	Pick Up Assembly	BP
					91Z895297	Cartridge	BB
PLAYER PARTS				MISCELLANEOUS			
101	91Z846573	Cabinet	BB	CNP101	QCNCM174EAFZZ	Plug, 5 Pin	AB
102	91Z846596	Chassis	AX	CNP102	QCNCM179KAFZZ	Plug, 10 Pin	AC
103	91Z896249	EP/LP Select Lever Ass'y (2)	AD	CNP201	QCNCM094CAFZZ	Plug, 3 Pin	AD
104	91Z896248	EP/LP Select Lever Ass'y (1)	AC	CNP202	QCNCM174EAFZZ	Plug, 5 Pin	AB

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
CNP203	QCNCM190JAFZZ	Plug, 9 Pin	AD	CNS903	91Z896535-2	Socket, 4 Pin	**
CNP204	QCNCM095BAFZZ	Plug, 2 Pin	AC	CNS904	QCNCW103FAFZZ	Socket, 6 Pin	AB
CNP301, } CNP302	QCNCM050BAFZZ	Plug, 2 Pin	AB	CNS905	QCNCW104GAFZZ	Socket, 7 Pin	AB
CNP401	QCNCM171BAFZZ	Plug, 2 Pin	AB	CNS906	91Z896535	Socket, 2 Pin	**
CNP402	QCNCM177HAFZZ	Plug, 8 Pin	AC	•F1	QFS-C402CAGNI	Socket, 22 Pin	AK
CNP403	QCNCM179KAFZZ	Plug, 10 Pin	AC	•F2	QFS-C800CAGNI	Fuse, 4 AT	AE
CNP501	QCNCM181MAFZZ	Plug, 12 Pin	AC	F3, F4	QFS-C402CAGNI	Fuse, 80 mA	AG
CNP502	Not Available	Tape Counter with 3 Pin Plug, Part of 022	—	F301	QFS-C631CAGNI	Fuse, 4 AT	AE
CNP503	QCNCM0806SGZZ	Plug, 8 Pin	AE	F302	QFS-C321CAGNI	Fuse, 630 mA	AE
CNP504	QCNCM174EAFZZ	Plug, 5 Pin	AB	F303	QFS-C202CAGNI	Fuse, 315 mA	AE
CNP505	QCNCM172CAFZZ	Plug, 3 Pin	AB	F304	QFS-C322CAGNI	Fuse, 2.0 AT	AE
CNP506	QCNCM177HAFZZ	Plug, 8 Pin	AC	F305, } F306	QFS-C402CAGNI	Fuse, 3.15 AT	AE
CNP507	QCNCM1301AGZZ	Plug, 13 Pin	AE	J1	QJAKJ0053AFZZ	Fuse, 4 AT	AE
CNP601	QCNCM180LAFZZ	Plug, 11 Pin	AC	J201	QJAKJ0053AFZZ	Jack, Headphone	AH
CNP701	QCNCM189GAFZZ	Plug, 7 Pin	AD	J202	QJAKJ0053AFZZ	Jack, Microphone (Left)	AH
CNP702	QCNCM178JAFZZ	Plug, 9 Pin	AC	ME101	RMTRL0157AFZZ	Jack, Microphone (Right)	AH
CNP801	QCNCM192MAFZZ	Plug, 12 Pin	AD	ME102	RMTRE0070AFZZ	Meter, Signal Strength	AS
CNP802	QCNCM191KAFZZ	Plug, 10 Pin	AD	ME501	RMTRL0158AFZZ	Meter, FM Pre-set	AS
CNP803	QCNCM194TAFZZ	Plug, 18 Pin	AE			Meter, Record/Playback Level (Left)	AS
CNP804	QCNCM192MAFZZ	Plug, 12 Pin	AD	ME502	RMTRL0159AFZZ	Meter, Record/Playback Level (Right)	AS
CNP805	QCNCM195LAFZZ	Plug, 11 Pin	AD				
CNP806	QCNCM172CAFZZ	Plug, 3 Pin	AB	M201	RMOTM0077AFZZ	Meter, Record/Playback Level	AS
CNP807	QCNCM176GAFZZ	Plug, 7 Pin	AB	PL1, } PL2, } PL3, } PL4	RLMPZ0050AFZZ	Motor, Volume Control	AY
CNP901	91Z5048-15A	Plug, 15 Pin	—	PL501	RLMPM0079AFZZ	Lamp, Dial/Meter Illumination	AG
CNP902	91Z896351-8	Plug, Pin	AH				
CNP903	91Z896351-4	Plug, 4 Pin	AE				
CNP904	91Z896351-6	Plug, 6 Pin	AF				
CNP905	91Z896351-7	Plug, 7 Pin	AG				
CNP906	91Z896351-2	Plug, 2 Pin	AD	PL701	RLMPM0080AFZZ	Lamp, Cassette Tape Illumi- nation	AF
	QCNCM121NAFZZ	Connecting Plug, 13 Pin (Tape Deck P.W.B.)	AE	PL702	RLMPM0080AFZZ	Lamp, APSS Indicator	AD
	QCNCM125SAFZZ	Connecting Plug, 17 Pin (Tape Deck P.W.B.)	AF	PL703	RLMPM0080AFZZ	Lamp, Reverse Indicator	AD
CNS101	QCNCW145EAFZZ	Socket, 5 Pin	AB	RLY101	RRLYZ0058AFZZ	Lamp, Fast Forward Indicator	AD
CNS102	QCNCW150KAFZZ	Socket, 10 Pin	AB	RLY301	RRLYZ0057AFZZ	Relay, LW/MW Selector	AL
CNS201	91Z895473	Socket, 3 Pin (Part of 143)	—			Relay, DC 24 V Protection Circuit	AV
CNS202	QCNCW145EAFZZ	Socket, 5 Pin	AB	RLY901	RRLYZ0058AFZZ	Relay, Speed Selector	AV
CNS203	QCNCW0902AGZZ	Socket, 9 Pin	AC	SOL501	RPLU-0072AFZZ	Solenoid, Record/Playback Switch	AS
CNS204	QCNCW085BAFZZ	Socket, 2 Pin	AB	SOL502	RPLU-0066AFZZ	Solenoid, Fast Forward/ Rewind	AV
CNS301	QCNCW059BAFZZ	Socket, 2 Pin	—	SOL503	RPLU-0066AFZZ	Solenoid, Record/Playback	AV
CNS302	QCNCW059BAFZZ	Socket, 2 Pin	—	•SO1	QSOCE0557AFZZ	Solenoid, Fast Forward/ Rewind	AV
CNS401	QCNCW142BAFZZ	Socket, 2 Pin	AA	SO2	QSOCD2469AFZZ	Voltage Selector	AP
CNS402	QCNCW148HAFZZ	Socket, 8 Pin	AB	SO3	QSOCD2469AFZZ	Socket, Speaker (A)	AF
CNS403	QCNCW150KAFZZ	Socket, 10 Pin	AB	SO101	QSOCD2259AFZZ	Socket, Speaker (B)	AF
CNS501	QCNCW152MAFZZ	Socket, 12 Pin	AB	SO102	QSOCD2259AFZZ	Socket, FM ANT.	AD
CNS502	QCNCW086CAFZZ	Socket, 3 Pin	AB	SO102	QSOCD2260AFZZ	Socket, AM ANT.	AE
CNS503	QCNCW0805SGZZ	Socket, 8 Pin	AC	SO103	QSOCD2557AFZZ	Socket (DIN), REC/PB	AF
CNS504	QCNCW145EAFZZ	Socket, 5 Pin	AB	SW1	QSW-P0158AFZZ	Socket (DIN), REC/PB	AF
CNS505	QCNCW143CAFZZ	Socket, 3 Pin	AA	SW2	QSW-P0165AFZZ	Switch, Power	AM
CNS506	QCNCW148HAFZZ	Socket, 8 Pin	AB	(A—C)	QSW-P0165AFZZ	Switch Ass'y, Speakers Selector	AN
CNS507	QCNCW163PAFZZ	Socket, 14 Pin	AF	SW101	QSW-P0166AFZZ	Switch Ass'y, Loudness/ Mono/AFC/FM Muting	AN
CNS601	QCNCW151LAFZZ	Socket, 11 Pin	AB	(A—D)	QSW-P0166AFZZ	Switch Ass'y, Loudness/ Mono/AFC/FM Muting	AN
CNS701	QCNCW0704SGZZ	Socket, 7 Pin	AC	SW201	QSW-P0169AFZZ	Switch with Button, Volume Increase	AH
•CNS702	QCNCW149JAFZZ	Socket, 9 Pin	AB	SW202	QSW-P0169AFZZ	Switch with Button, Volume Decrease	AH
CNS801	QCNCW1201AGZZ	Socket, 12 Pin	AC	SW501	QSW-S0075AGZZ	Switch, Record/Playback	AH
CNS802	QCNCW1002AGZZ	Socket, 10 Pin	AB	SW502	QSW-P0168AFZZ	Switch, Beat Cancellor	AG
CNS803	QCNCW1801AGZZ	Socket, 18 Pin	AC	SW503,			
CNS804	QCNCW1201AGZZ	Socket, 12 Pin	AC	SW504,	QSW-P0167AFZZ	Switch Ass'y, BIAS/EQ/ALC/ DOLBY NR	AR
CNS805	QCNCW1101AGZZ	Socket, 11 Pin	AC	SW505,			
CNS806	QCNCW143CAFZZ	Socket, 3 Pin	AA	SW506			
CNS807	QCNCW147GAFZZ	Socket, 7 Pin	AB	SW507	QSW-M0057AFZZ	Switch, Eject	AG
CNS901	91Z895382-4	Socket, 15 Pin	**				
CNS902	91Z896535-4	Socket, 8 Pin	**				

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
SW508	QSW-M0057AFZZ	Switch, Record Safety	AG	345	LANGQ0584AFZZ	Bracket, Remote Control	**
SW509	QSW-M0057AFZZ	Switch, Cassette Tape	AG			Socket	
301	GCABA1472AFSA	Cabinet, Top	**	346	LANGR0433AFZZ	Bracket, Main Power Trans-	**
302	GCABB1472AFSA	Cabinet, Bottom	**			former	
303	GCOVA1084AFSA	Dust Cover	BC	347	LANGR0434AFZZ	Bracket, Relay	**
304	GCOVA1085AFSA	Cover, Hinge (Right)	AC	348	LANGR0435AFZZ	Bracket, Volume Control	**
305	GCOVA1086AFSA	Cover, Hinge (Left)	AC	349	LANGT0683AFZZ	Bracket, Tuner/Tape Deck	**
*306	GCOVD3006AFSA	Cover, FM ANT. Socket	AA			P.W.B. Retaining	
307	GCOVH3151AF00	Cover, Heatsink	**	350	LANGT0684AFZZ	Bracket, FM Pre-set Volume	**
308	GFTAC1080AFSA	Cassette Lid	**			P.W.B. Retaining	
309	GFTAF1004AFSA	Lid, Remote Control Compart-	**	351	LANGT0685AFZZ	Bracket, Touch Control P.W.B.	**
		ment				Retaining	
310	GFTAU3074AFZZ	Cover, Cabinet Bottom	**	352	LANGT0687AFZZ	Bracket, Tuning Shaft	**
311	GMADD0059AFSA	Window Panel, Dial Scale/	**	353	LANGT0688AFZZ	Bracket, Front Panel Retaining	**
		Meter				(Right)	
312	HBDGB3001CESA	Badge, SHARP	AD	354	LANGT0689AFZZ	Bracket, Front Panel Retaining	**
313	HDALP0386AFSA	Dial Scale	**			(Left/Center)	
314	HDAP-0173AF00	Dial Plate	AL	355	LANGT0691AFZZ	Bracket, Dial Scale/Pulley	**
315	HDECA0289AFSA	Decoration Panel, Cabinet Top	AU			(Right)	
		(Right)		356	LANGT0692AFZZ	Bracket, Dial Scale/Pulley	**
316	HDECA0290AFSA	Decoration Panel, Cabinet Top	AU			(Left)	
		(Left)		357	LANGT0693AFZZ	Bracket, Meter	**
317	HDECQ0064AFSA	Decoration Cover (Orange), FM	AB	•358	LBSHC0004AGZZ	Bushing, Mains Supply Cord	AC
		STEREO			LBSHC0053AFZZ	Bushing, Mains Supply Cord	AB
318	HDECQ0064AFSB	Decoration Cover (Green),	AB	359	LHLC1052AFZZ	Holder, AM Antenna	AD
		DOLBY NR		360	LHLDP8057AF09	Holder with Lamp (FM	**
319	HDECQ0075AFSA	Decoration Cover, VOLUME	**			STEREO/DOLBY NR)	
•320	HINDM1219AFSA	Decoration Plate, Model	**	361	LHLDW1027AGZZ	Holder, Wire	AA
321	HINDP0126AFSA	Decoration Cover, APSS	**	362	LHLDW1053AFZZ	Holder, Wire	AB
322	HPNLC1240AFSA	Front Panel	**	363	LHLDW1066AFZZ	Holder, Wire	AA
323	HSSND0241AFSA	Dial Pointer	AE	364	LHLDW1067AFZZ	Band, Wire	AA
324	JKNBK0168AFSA	Knob, Tuning Control	**	365	LHLDW1068AFZZ	Band, Wire	AA
325	JKNBM0259AFSA	Button, LOUDNESS/MONO/	**	366	LHLDW9002CEZZ	Holder, Wire	AA
		AFC/FM MUTING/TAPE		367	LHLDW9003CEZZ	Holder, Wire	AA
		Selector/ALC/DOLBY NR		368	LHLDZ1041AG00	Holder, LED (Power Source	AB
327	JKNBM0261AFSA	Button, Beat Canceller Switch	**			Indicator)	
328	JKNBP0055AFSC	Button, Mains Power Switch	**	369	LX-BZ0246AFZZ	Screw, Player Board Retaining	AA
329	JKNBP0078AFSB	Button Speakers Selector	AC	370	LX-BZ0259AFFD	Screw, Remote Control Socket	AA
		Switch				Retaining	
330	JKNBP0084AFSA	Knob, BASS/TREBLE/	**	371	LX-HZ0001SGFD	Screw, Relay/Power P.W.B.	—
		BALANCE Control				Retaining	
331	JKNBP0084AFSB	Knob, RECORD LEVEL	**	372	LX-HZ0066AFFD	Screw, Power Transformer	—
		Control				Bracket Retaining	
332	JKNBP0085AFSA	Button, EJECT	**	373	LX-NZ0120AFFD	Nut, Power Transformer	AA
333	LANGF0195AFZZ	Plate, Main Power Transformer	**			Retaining	
		Retaining		374	MARMP0003AFZZ	Arm, Dust Cover (Right)	AD
334	LANGF0426AFZZ	Bracket, Cassette Lid	**	375	MARMP0004AFZZ	Arm, Dust Cover (Left)	AD
335	LANGF0431AFZZ	Bracket, Heatsink Retaining	**	376	MHNG-0110AFZZ	Hinge Ass'y (Right)	**
		(Right)		377	MHNG-0111AFZZ	Hinge Ass'y (Left)	**
336	LANGF0432AFZZ	Bracket, Heatsink Retaining	**	378	MLEVF0794AFZZ	Lever, Cassette Lid Eject	**
		(Left)		379	MLEVP0025AG00	Lever, Cassette Lid Lock	AB
337	LANGF0443AF00	Plate, Cassette Lid Strengthen-	**	380	MLEVP0109AF00	Lever Ass'y, Cassette Lid Eject	**
		ing		381	MSPRT0304AFFJ	Spring, Dial Cord	AA
338	LANGF0436AFZZ	Bracket, Volume Bracket	**	382	MSPRT0388AFFJ	Spring, Cassette Lid Eject	AA
		Strengthening (Right)		383	MSPRT0526AFFJ	Spring, Cassette Lid Opening	**
339	LANGF0446AFZZ	Bracket, Volume Bracket	—	384	MSPRZ0053AFFJ	Spring, Cassette Lid Opening	AA
		Strengthening (Left)		385	NDRM-0002SGZZ	Drum, Dial Cord	AH
340	LANGH0113AFZZ	Bracket, Cabinet Bottom	**	386	NPLYB0001SEZZ	Pulley (Small), Dial Cord	AC
		Strengthening		387	NPLYB0001SGZZ	Pulley (Large), Dial Cord	AB
341	LANGK0181AFZZ	Plate, Hinge Ass'y, Retaining	AB	388	NPLYC0101AFFD	Shaft, Dial Cord Pulley	AA
342	LANGK0194AFZZ	Bracket, Logic P.W.B.	**	389	NSFTD0182AFFW	Tuning Shaft with Flywheel	**
		Retaining		390	NSFTZ0064AFFW	Damper Shaft, Cassette Lid	**
343	LANGQ0582AFZZ	Bracket, Record Level Control	**			Opening	
344	LANGQ0583AFZZ	Bracket, Cabinet Bottom	**	391	PCOVP3161AFZZ	Cover, Remote Control Unit	**
						Compartment	

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
392	PCOVS3063AFZZ	Shield, Pre-amp. P.W.B.	**	422	QANTW0054AFZZ	FM Antenna	AL
393	PCOVU8112AF00	Cushion Rubber, Meter	AD	423	QFSHC2051AFZZ	Holder, Fuse	AD
394	PCOVU8113AF09	Cover, Lamp (REV/APSS/ FWD)	**	424	QFSDH1001AGZZ	Holder, Fuse	AB
395	PCUSF0008AF00	Felt, Push Switch Button	AA	425	QHWS-3206AGFN	Lug Terminal	-
396	PCUSF0009AF00	Felt, Volume Control Motor/ Cabinet Bottom	AA	426	QLUGL0201SEZZ	Terminal Strip, 3-lugs	AA
397	PCUSF0010AF00	Felt, Cabinet Top	AA	427	QLUGL0250AFZZ	Terminal Strip, 2-lugs	AC
398	PCUSF0011AF00	Felt, Cabinet Top (12 x 170 mm)	**	428	QLUGL0451AFZZ	Terminal Strip, 4-lugs	AD
399	PCUSG0087AF00	Cushion, Cassette Lid (7φ)	**	429	QLUGP0102AGZZ	Lug Terminal	AA
400	PFLT-0277AFZZ	Felt, Leg	AB	430	QLUGP0104AGZZ	Lug Terminal	AA
401	PGIDH0053AFZZ	Guide, Cassette Lid Eject Lever	**	431	QLUGP0111CEFW	Lug Terminal (13mm)	AA
402	PGUMM0061AG00	Cushion Rubber, Dust Cover	AB	432	QLUGP9050AFFW	Lug Terminal (16mm)	-
403	PGUMM0128AF00	Cushion Rubber, Dust Cover	**	433	QLUGP9052AFZZ	Lug Terminal	AA
404	PRDAR0164AF00	Heatsink, Power IC	AY	*434	QPLGA0205AGZZ	Plug, Mains Supply Cord (QACCS9001CE00)	AK
405	PRDAR0166AFFW	Heatsink, Transistor	AE	435	QPWBF0713AFZZ	P.W. Board, Tuner	-
406	PSHEF0120AF00	Felt, Record Level Control	AA	436	QPWBF0714AFZZ	P.W. Board, Power	-
407	PSHEF0121AF00	Felt, Bass/Treble/Balance Control	AA	437	QPWBF0715AFZZ	P.W. Board, Touch Control	-
408	PSHEF0122AF00	Felt, Volume Indicator Cover	AA	438	QPWBF0716AFZZ	P.W. Board, Tape Deck	-
409	PSHEF0124AF00	Felt, Speakers Selector Switch	**	439	QPWBF0717AFZZ	P.W. Board, Logic	PBW only
410	PSHEZ0067AFZZ	Sheet, Cabinet Top (Right)	**	440	QPWBF0718AFZZ	P.W. Board, Volume	-
411	PSHEZ0068AFZZ	Sheet, Cabinet Top (Left)	**	441	QPWBF0719AFZZ	P.W. Board, Pre-amp.	-
412	PSLDM7108AFZZ	Shield, Power P.W.B.	**	442	QPWBF0720AFZZ	P.W. Board, Tone	-
413	PSLDM7109AFZZ	Shield, Pre-amp. P.W.B.	**	443	QPWBF0721AFZZ	P.W. Board, Sub Power	-
414	PSLDM7110AFZZ	Shield, Tone P.W.B.	**	444	QPWBF0722AFZZ	P.W. Board, Lamp	-
415	PSLDM7111AFZZ	Shield, Volume P.W.B.	**		SPAKA0507AFZZ	Cushion, Player Board	**
416	PSPAG0062AF00	Spacer, Volume Control Motor	AB		SPAKA0508AFZZ	Cushion, Back (Unit)	**
417	PSPAH0050AF00	Felt, Cassette Lid (3.8φ)	**		SPAKA0509AFZZ	Cushion, Front (Unit)	**
418	PSPAS0065AF00	Spacer, Volume Indicator	**		•SPAKC1118AFZZ	Packing Case	**
419	PSPAV0057AFZZ	Spacer, FM Pre-set Volume	**		SPAKP0110AFZZ	Sack, Unit	AH
420	PSPA0076AFZZ	Felt, Eject Button	**		SPAKP0111AFZZ	Cushion (Small)	**
•421	QACCL0001AFZZ	Mains Supply Cord (SAA)	AR		SPAKP0113AFZZ	Cushion (Large)	**
	QACCS9001SE00	Mains Supply Cord (SEV, without Plug)	AG		SPAKX0184AFZZ	Sheet, Cartridge/Weight Holding	**
	QACCC0002TA0F	Mains Supply Cord (USA type Plug)	AF		SSAKA0007SEZZ	Sack, Operation Manual etc.	AA
	QACCC0052AF00	Mains Supply Cord (CEE)	AP		SSAKA0080AGZZ	Sack, Cartridge/Weight	AA
	QACCC0053AF00	Mains Supply Cord (EXMAA)	AK		•SSAKA0101AFZZ	Sack, Mains Supply Cord	**
					SSAKH0010SEZZ	Sack, Player Board	**
					TINSL0121AFZZ	Operation Manual, English/ German/French	
					•TINSZ0094AFZZ	Operation Manual, Swedish	**
					•TTAGH0030AFZZ	Tag, English/German/French	**

DIFFERENCE BETWEEN SG-500H AND SG-500E

REF. NO.	SG-500H		SG-500E		DESCRIPTION
	PART NO.	CODE	PART NO.	CODE	
T1	RTRNP0543AFZZ	BQ	RTRNP0548AFZZ	---	Main Power
T2	RTRNP0544AFZZ	AV	RTRNP0549AFZZ	---	Sub Power
T103	RCILIO209AFZZ	AH	RCILIO221AFZZ	AH	AM IF (H:455 kHz, E:465 kHz)
T105	RCILIO219AFZZ	AE	RCILIO220AFZZ	AE	AM IF (H:455 kHz, E:465 kHz)
CNS702	QCNCW149JAFZZ	AB	QCNCW0902AGZZ	AC	Socket, 9 Pin
F1	QFS-C402CAGNI	AE	QFS-C252CAGNI	AE	Fuse (H:4 AT, E:2.5 AT)
F2	QFS-C800CAGNI	AG	QFS-C400CAGNI	AH	Fuse (H:80 mA, E:40 mA)
SO1	QSOCE0557AFZZ	AP	Not Used	---	Voltage Selector
SO104	Not Used	---	QSOCZ2161AFZZ	AG	Socket, FM EXT. ANT. (75 ohm)
306	GCOVD3006AFSA	AA	Not Used	---	Cover, FM EXT. ANT. Socket
320	HINDM1219AFSA	**	HINDM1227AFSA	**	Decoration Plate, Model
358	LBSHC0004AGZZ	AC	LBSHC0004AGZZ	AC	Bushing, Mains Supply Cord
	LBSHC0053AFZZ	AB			
421	QACCL0001AFZZ	AR	QACCB0052AF09	AM	Mains Supply Cord
	QACCS9001SE00	AG			
	QACCC20002TA0F	AF			
	QACCC20052AF00	AP			
	QACCC20053AF00	AK			
422	QANTW0054AFZZ	AL	Not Used	---	FM Antenna
434	QPLGA0205AGZZ	AK	Not Used	---	Plug, Mains Supply Cord
445	Not Used	---	GCOVH3152AFSA	**	Cover, Voltage Selector
	SPAKC1118AFZZ	**	SPAKC1132AFZZ	**	Packing Case
	SSAKA0101AFZZ	**	Not Used	---	Sack, Mains Supply Cord
	TINSZ0094AFZZ	**	Not Used	---	Operation Manual, Swedish
	TTAGH0030AFZZ	**	Not Used	---	Tag, English/German/French